NOLOGY DEPT

APRIL 1945

Chemical Industries

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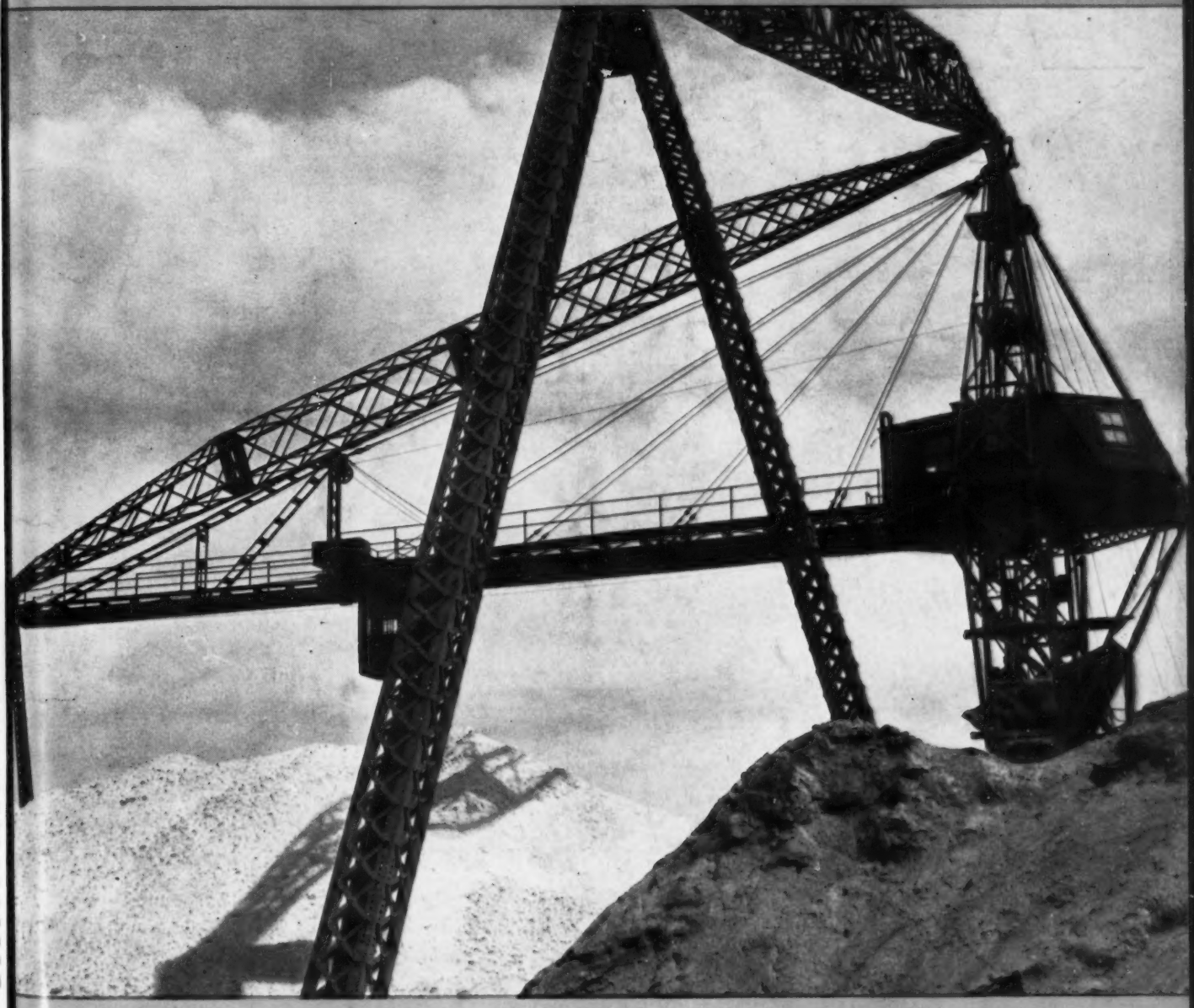

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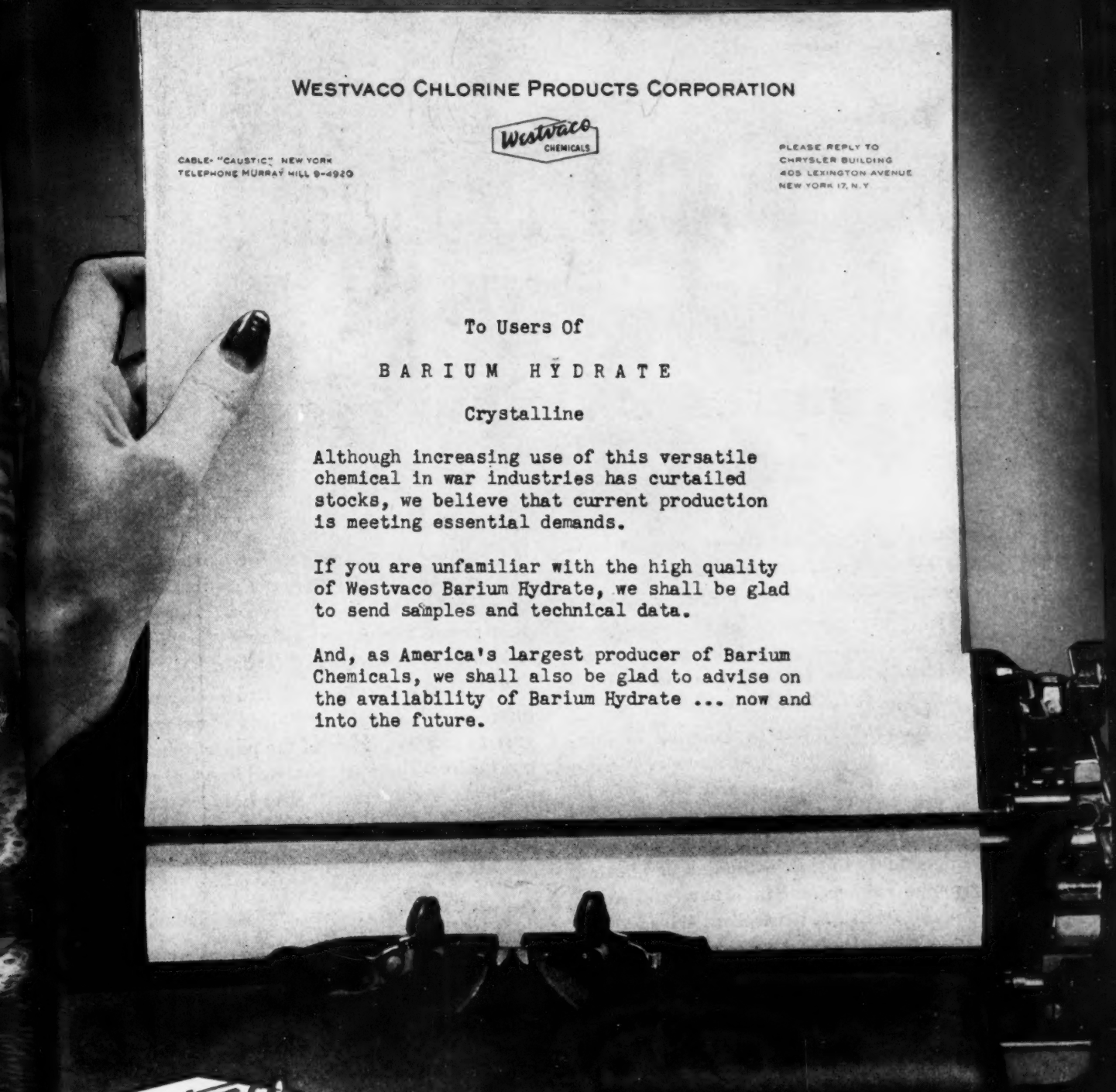

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THE CHEMICAL BUSINESS MAGAZINE

Chemical Industries

VOLUME 56
NUMBER 4

ABP ABC

April 1945

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COVER PHOTO courtesy of Monsanto Chemical Co.

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THE READER WRITES

Color in Chemical Plants

To the Editor of Chemical Industries:

I believe the January issue of CHEMICAL INDUSTRIES is one of the very best that I have ever read.

I think "Color—A New Element in Chemical Plant Design," by Alden B. Dow, is topnotch. His thesis is thoroughly sound, and I am passing the issue around to our whole engineering department for their consideration. There isn't any reason on earth why plants can't be beautified, which would certainly reflect on the health and satisfaction of those who run them, particularly if the color schemes are right.

GUSTAV EGLOFF
Universal Oil Products Co.
Chicago, Ill.

Dutch Dye Imports

To the Editor of Chemical Industries:

On page 103 of your January issue, we found, under the heading "New U. S. Dye Markets Foreseen," a statement which we would like to correct.

Although the larger part of the dyestuffs used in the Dutch textile industry were imported from Germany, there has never been any question of a monopoly granted by the Netherlands Government to the I. G. Farben or any other German producer. It can easily be understood, however, that the I. G. Farben succeeded in establishing a very strong position on the Dutch dyestuff market at that time because of its proximity, its effective marketing and its services rendered to customers. There was before the war no dyestuff industry of any importance in the Netherlands.

This situation, however, will undoubtedly undergo a radical change after the war and we expect with you that there will exist good prospects for the importation of American dyes in Holland.

G. SIMONS
The Netherlands Information Bureau
New York, N. Y.

New Chemicals for Industry

To the Editor of Chemical Industries:

I think you have done a great service to the industry in publishing the list of new chemicals in the October issue of CHEMICAL INDUSTRIES. I am wondering if it is possible to obtain a reprint of this list. If so, it would be very much appreciated.

L. J. BERBERICH, Section Engineer
Insulation Department
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

We're sorry, and we apologize to Mr. Berberich and the considerable number of other readers whose requests for additional copies of "New Chemicals for Industry" from our October issue have had to go unfilled. The truth is that while our supply of extras of this section was just as great as in previous years, it disappeared just about twice as fast. Interest in new chemicals seems to be running at a new high.—Editor.

Colorful Opportunity

To the Editor of Chemical Industries:

Alden B. Dow's article "Color—A New Element in Chemical Plant Design" in your January issue calls attention to an opportunity for something that should be a real step forward in the practices of chemical industry. The intelligent use of color in chemical plants should do much to improve the operator's work place and his frame of mind in general. Can you send me three reprints of this article?

ROBERT TEETER, Chemical Engineer
1209 Morningside Circle
Kingsport, Tennessee

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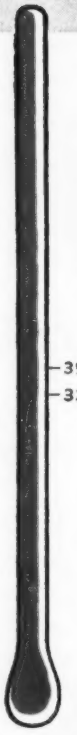

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CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

WASHINGTON

T. N. SANDIFER *reporting*

Chemicals for Lend-Lease • Voorhis Bill Back • Chemical Linters Carbon Black • Gas Rebate Delayed • Sabath Bill

Production Difficulties Grow

GROWING EVIDENCE reaching here is to the effect that industry generally, and chemical production particularly, is badly overloaded by the accelerated demands from war procurement agencies.

The effect is very similar to the results of an overenthusiastic amateur stepping into a room full of levers and switches, and attempting to work them all at once.

Experienced industry men here recognize that the present situation was almost inevitable. War production demands were suddenly hiked against drastically declining manpower, transportation tie-ups, and material shortages.

In chemical output especially, the War Department's insistence on its manpower demands has been reflected in departmental shutdowns to permit shifting available workers to more critical manufacture, and there is likelihood that further crippling of operations will follow.

Representatives of the industry have been endeavoring to show the effect on finished production, of the shortage or lack of even a seemingly minor component. These shortages may result from manpower deficiencies in a given plant, or from the increasingly frequent shipping tie-ups, but the end result is the same in any case.

The Byrnes screening committee was established to introduce some realistic planning in food and raw material allocations abroad, and the expectation is that some overall planning may be ordered for other production as well, if present trends continue.

Chemical Purchases for Lend-Lease

PURCHASES OF ALL KINDS for Lend-Lease by the Treasury's Office of Procurement totaled $1,086,587,323 in 1944, and at the present rate will exceed in 1945 the last year's aggregate by about $400,000,000.

This agency's purchases for Lend-Lease include chemicals, largely industrial chemicals, besides metals, minerals, and metal concentrates, among other commodities. Among industrial chemicals bought in large quantities have been phosphates and sulfur. To preclude deterioration, the practice now is to buy for delivery just about the dates of shipment, purchases of sulfur, for instance, being delivered and loaded in quantity. Where this is not specified, Treasury officials state, goods are in the hands of the supplier pending delivery.

Purchases in general, by the Procurement Office for Lend-Lease, are destined for Russia, the United Kingdom, France, North Africa, and China principally, but are also made for other lesser beneficiaries.

General Lend-Lease purchases by this particular agency up to the end of 1944 amounted to $4,388,200,781.

The most recent Lend-Lease report to Congress, apart from the above figures taken from another source, stresses chemicals, chemical warfare supplies, petroleum products, and catalyst materials, among shipments to allied nations, principally those listed here.

Clayton Act Amendment Offered

S. 615, BY SENATOR O'MAHONEY, and a companion House version by Representative Kefauver, have been introduced on the recommendation of the Federal Trade Commission. They would empower FTC to bar the acquisition of assets and property of competing corporations above a certain size, except where the purchase conforms to the present law governing stock purchases under the Clayton Act.

Voorhis Patent Bill

REP. VOORHIS, DEM., CALIF., has introduced in this session as H.R. 97 the bill which he offered in the 78th Congress, which would in effect deprive a patent holder of his patent if it were found to be used in restraint of trade. The bill died with the last Congress, but in its present guise, is actively before the House Judiciary Committee.

The bill has the active endorsement of the anti-trust division of the Department of Justice, and in fact was introduced in the present session by Congressman Voorhis apparently in pursuance to the language of a recent Supreme Court decision (Hartford Empire Company vs. U. S.) in which the majority opinion observed that while Hartford Empire had violated the anti-trust laws in its use of patents, the Court lacked the power under existing anti-trust statutes to

seize the patents or to restrain the company from enforcing them in the future.

The Supreme Court pointed out that Congress had failed to pass supporting legislation penalizing the use of a patent in restraint of trade, and evidently the majority opinion writers were referring to the failure to pass the Voorhis bill in the 78th Congress. In any event, the bill is being offered again.

It will be recalled from earlier references here, that this bill authorizes Federal intervention in court proceedings involving infringement or validity of patents, requires registration of patent agreements with the Attorney General, nullifies patents found to be used illegally in restraint of trade, and permits determination of the validity and scope of patents in anti-trust proceedings.

Criticism of the bill has stressed that its language is so broad as to permit the utmost latitude in finding that a patent has been misused under the law, and that it is hence subject to being declared unenforceable by the patent holder.

Salary Controls in Doubt

THE SALARY STABILIZATION LAW will expire by limitation next June 30, 1945, unless Congress re-enacts this limitation on earnings. While it is not to be taken as an indication of the trend, Congress failed to provide funds in recent appropriation bills for continuation of the salary stabilization unit in the Treasury, and in this omission was strictly in line with the Budget Bureau recommendations, the Bureau having disapproved an estimate for this purpose.

Congress can still act to preserve this regulation, and funds can be passed as a deficiency item, so that it is too soon for any conclusions on the subject.

New Gas Pipeline Planned

THE FEDERAL POWER COMMISSION has been asked to approve the proposed construction of an 825-mile natural gas pipeline from East Texas gas fields to Ohio, center of many chemical manufactures, with an initial daily capacity of 140,000,000 cubic feet of gas.

It is proposed to start construction during April, 1945, and complete the line about October 31, this year.

Chemical Cotton Linters

THERE IS REPORTED A SERIOUS SHORTAGE of chemical linters, which has led to several moves by War Production Board and other agencies. The most recent action is an Office of Price Administration amendment to its pricing regulation designed to discourage a large quantity of chemical rejects at the mill and to induce a maximum output of acceptable linters.

Under current directives, cotton-seed mills are required to sell 80 percent of their output of linters to the chemical industry for use in explosives or other war commodities. The other 20 percent, as well as any chemical rejects, may be sold as free linters.

While it is recognized that mills acting in good faith are not always able to produce chemical linters of acceptable grade, it was felt by OPA that re-establishing the former maximum price for rejects would stimulate mills to produce their maximum quantity of essential chemical cotton linters. At the instigation of the War Production Board, it is understood, OPA first consulted industry members and has now ordered a maximum of 3.23 cents per pound.

It may be recalled that earlier, in an effort to meet the shortage, the U. S. purchased 100,000 bales of cotton linters from South American sources.

Supreme Court Delays Natural Gas Users' Rebate

THERE IS NOW SOME $30,000,000 impounded by various circuit courts of appeal pending a decision as to whether rebates over specified rates may be paid to industrial and other consumers of natural gas in Kansas, Missouri, Oklahoma, New Mexico, Colorado, Wyoming, Illinois, Indiana, Michigan, Ohio, Tennessee, Mississippi, Georgia and Alabama, the Federal Power Commission states. In one case, it is stated, more than $800,000 will have been paid into the court during February.

On February 12, the U. S. Supreme Court reversed a ruling of a circuit court, which, in the case of one company, had held that the overcharges, where they existed under the Federal Power Commission's decisions, should be paid to the ultimate consumers who had paid the excessive rates, rather than the distributing intermediary. The Supreme Court decision has had the effect of throwing the matter back into State courts.

Meanwhile, in past weeks the action of the Office of War Utilities of WPB ordering industrial plants having natural gas stand-by facilities to use these in order to conserve coal, has emphasized the situation for industrial users of natural gas, since the higher rates continue in effect.

In this general connection, the Federal Power Commission has called the first hearing in its natural gas investigation for May 1, 1945, in Kansas City, Mo. It has decided that public hearings will be scheduled during May and June, to be held in the principal gas-producing areas, which besides Kansas, include Texas, Louisiana, and other states. This represents a decision to proceed against both official and other opposition, some of which emanated from the Petroleum Administration which felt that it should have had a larger share in the proceedings, and which it will not have, from all indications.

Sabath Bill of Interest

THE SABATH BILL FOR a Senate committee investigation of all phases of agricultural marketing and distribution has some aspects applicable to the chemical field, in that the investigation, if it is finally approved by Congress, will delve into fertilizer production and distribution, insecticides, fungicides, and broad policy matters affecting these products.

The bill has only been introduced and has not been voted on.

Strategic Planning
—FRAMEWORK FOR FINAL VICTORY

In this war, more than in any other war in history, victory depends on broad strategic planning. For huge land, sea and air forces must be distributed over vast areas and deployed into positions of tactical advantage from which decisive blows may be struck. This calls not only for military skill but for the specialized skills for which America is famous—technical ingenuity, mechanical ability and especially the application of "mass" methods to production, transportation, construction and the use of many technical sciences on a large volume scale. Indeed, America possesses that vital "Margin of Experience" in these activities which permits strategic planning on an unprecedented scale and has already established the framework for the final victory.

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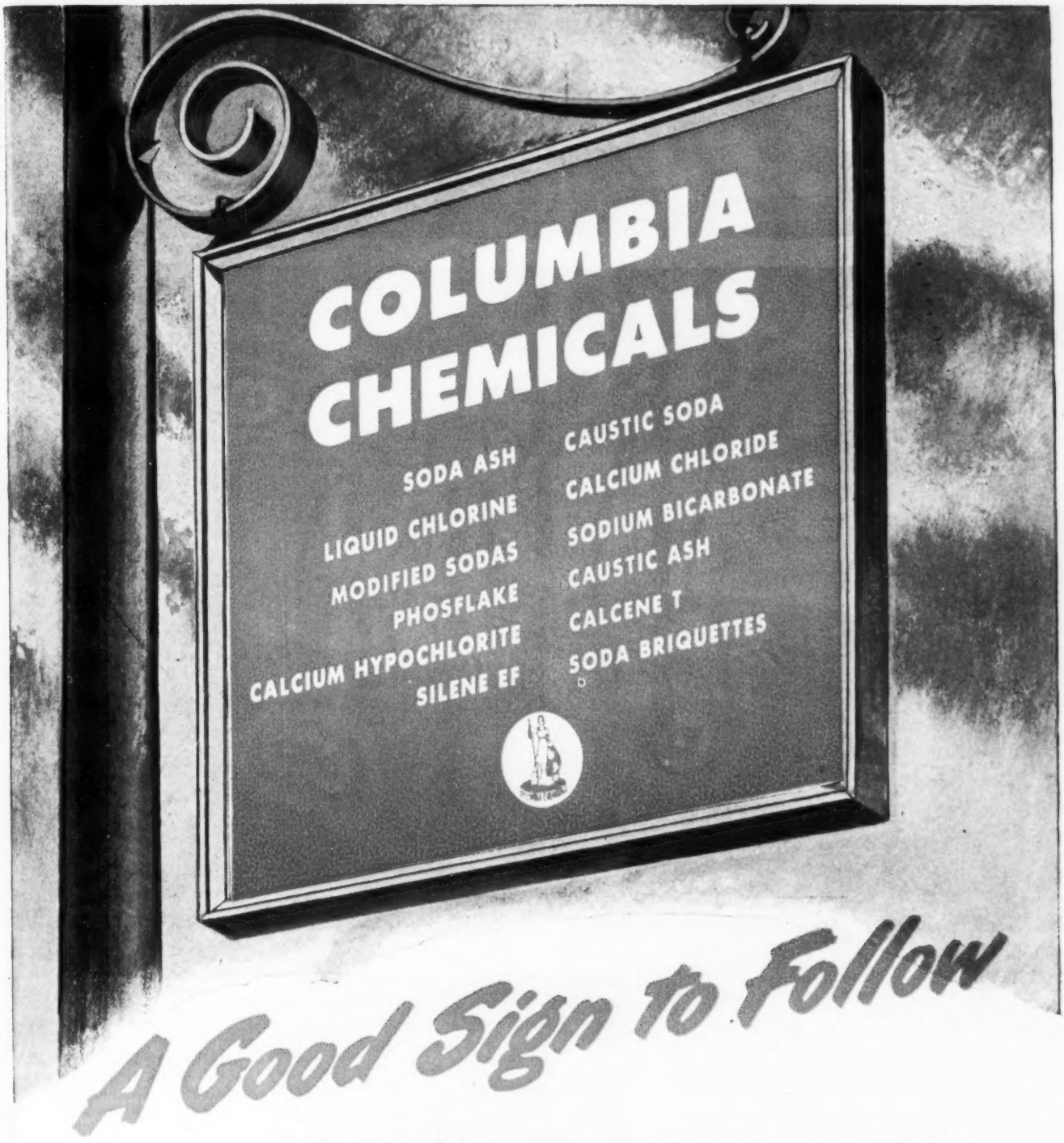

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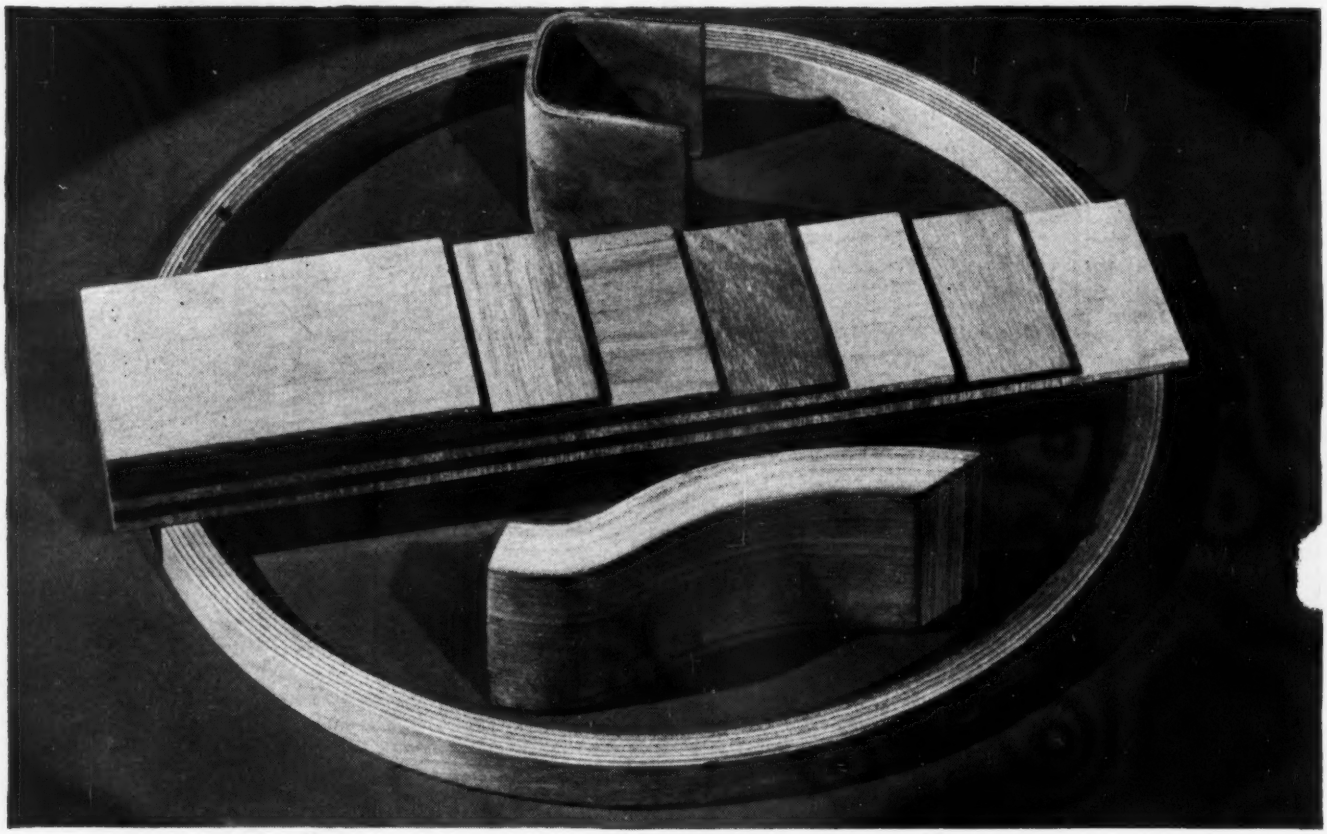

(*Above*) **PLYWOOD,** consisting of three or more sheets of resin-bonded wood veneer, usually placed with grain of alternate plies at right angles, has the advantages of equalization of strength properties in length and width, greater resistance to splitting and dimensional changes due to moisture.

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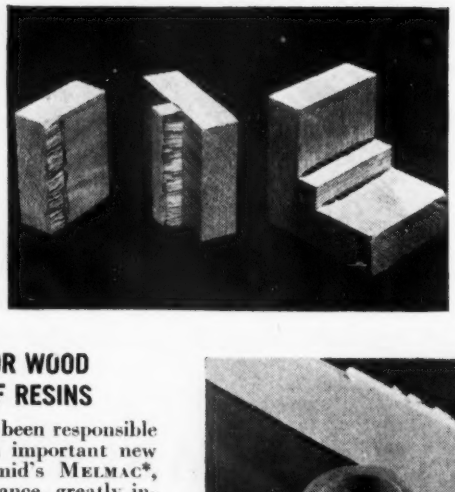

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(*Below*) **PAPER LAMINATES** have high tensile strength, are resistant to moisture, and are extremely stable at both high and low temperatures. They are resistant to denting and scratching, have a smooth surface, and can be compressed into simple shapes or molded in curved patterns.

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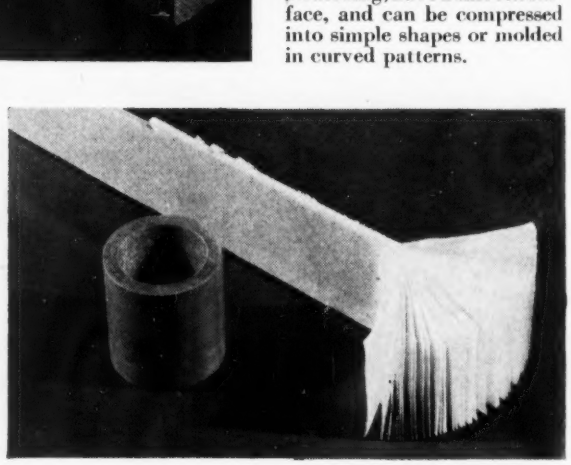
The development of synthetic resins and adhesives has been responsible for significant advances in the utilization of wood in important new fields of use. New industrial resins such as Cyanamid's MELMAC*, MELURAC*, BEETLE*, and URAC*, bring moisture-resistance, greatly increased strength, moldability into wood.

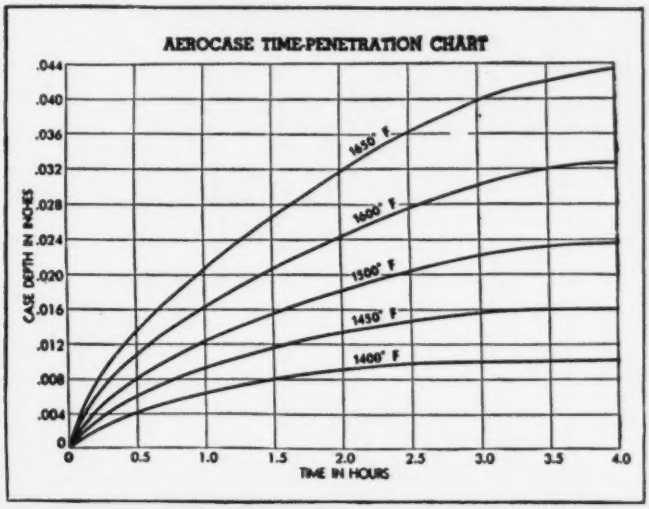
Resin-bonded plywoods can be bent, molded, and built into any desired shape, size, or thickness, from small aircraft parts to 50-foot sections for the decks of Army and Navy boats, sub-assemblies for the DeHavilland Mosquito bomber, girders, beams, and joists.

Laminated wood, with strength qualities comparable to steel, can be made in straight or curved form. Laminated paper, lighter than metals and strong as many, can also be compressed into simple shapes or molded into curved patterns. Resin-impregnated wood, laminated paper, and other materials provide applications in "sandwich" wood construction.



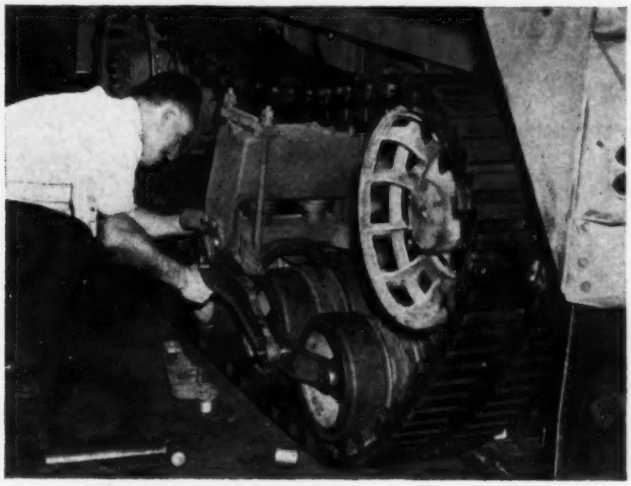
Chemical Newsfront

(*Below*) **HYDRO-BOAT WITH SHALLOW DRAFT** and air screw above water skims along at a speed of 75 miles an hour . . . another of tomorrow's modern designs which will require beautiful and durable new protective surface coatings. Through Cyanamid's extensive research, suitable synthetic resin vehicles have been developed to meet such postwar demands. Today, they are meeting the varied and exacting specifications for military and naval surface coating requirements. With Victory, Cyanamid resins will be ready to meet new requirements for improved surface coatings.



(*Right*) **BOBBIN WOUND SUTURES** have recently been made available to the medical profession by Davis & Geck, Inc., to meet a demand created by the increasing use of suturing instruments. These Thermoflex Catgut Sutures, of standard length (in excess of 54 in.) are wound on stainless steel bobbins and heat sterilized in hermetically sealed glass tubes. Each tube contains three bobbins which fit surgical stitching instruments. Davis & Geck, Inc., for many years, have specialized exclusively in the manufacture of surgical sutures, applying its extensive research and development activities to constantly advancing standards of service to the surgical profession.

*Reg. U. S. Pat. Off.



(*Above*) **NON-SODIUM CYANIDE BATHS** for case hardening are available without priority in the form of AEROCASE* Case Hardening Compounds. This two-component bath assures absolute control in obtaining uniform results. The molten bath consists of the Granular No. 510 Compound, which serves as a heating medium and possesses no case hardening properties of its own. The No. 28 Case Hardening Compound, supplied in block form, is added in small quantities at regular intervals to impart and maintain uniform carburizing activity. The carburizing activity of the AEROCASE bath is so great that the maximum rate of carbon diffusion into the steel is always obtained, resulting in exceedingly great hardness.

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.

four stars ...

We are proud of the fact that we have recently been awarded a fourth renewal of the Army-Navy "E" flag—proud that we have been able to maintain our production of magnesium powder, that ingredient so vital in the manufacture of tracer bullets and shells, parachute flares, float lights, photo flash bombs and chemical formulas.

National Magnesium has only been engaged in the difficult and delicate job of processing magnesium powder for a little more than three years. However, out of this war experience has come the skill and knowledge to grind other metals and materials which will play their part in the fashioning of a better world that lies beyond final victory.

Executives and engineers of industries interested in the planning of post-war products, through the use of powdered metals and other materials, are invited to consult with members of our research staff.

NATIONAL MAGNESIUM CORPORATION OF MARYLAND

ELKTON, MD. NEW YORK, N. Y.

NATIONAL MAGNESIUM CORPORATION NAMCO POWDER

ANHYDROUS HYDROFLUORIC ACID

FORMULA: HF

DESCRIPTION: A colorless, corrosive, fuming liquid. It volatilizes easily and on contact with the atmosphere, forms a visible cloud similar in appearance to steam.

PHYSICAL PROPERTIES:

AHF has a sp. gr. of 1.008 at 0°C (32°F); its boiling point is 19.4°C (66.9°F); its freezing point is about -85°C (-121°F). Its viscosity for all practical purposes is comparable to water. It flows freely and can be handled in comparatively small pipe lines. It can be used either in the liquid or gaseous form in reactions.

Its heat of solution with water is approximately 11,600 cal. per gram formula weight (1040 Btu/lb), and its heat of vaporization is approximately 6000 cal. per gram formula weight (540 Btu/lb).

CHEMICAL PROPERTIES:

The commercial AHF contains a minimum of 99.0% HF, and very low percentages of H_2SiF_6, SO_2, and H_2SO_4 as impurities. A very pure acid containing a higher percentage of HF, less than 0.35% of water, and virtually approaching a C.P. acid in respect to impurities is also available for reactions where needed. For methods of analysis of AHF, see analytical edition of Ind. Eng. Chem., Vol. 16, P. 483 (Aug. 15, 1944).

The acid reacts rapidly with silica, and attacks such materials as glass, porcelain, enamelware, asbestos, etc.

In addition, lead, cast iron, wood, rubber and most plastics are attacked and are unsatisfactory for handling the acid.

Monel, copper and mild carbon steel have excellent resistance to the anhydrous acid and are being used successfully in handling it in commercial installations. Platinum is probably the most resistant of all metals and silver has excellent resistance in the absence of sulphides.

The acid reacts violently with water, and where it is to be diluted or added to solutions, installations should be designed so as to guard against the possibility of water being forced or drawn into cylinders or containers of the strong acid. Special attention must be given to materials of construction when handling aqueous solutions of HF.

SOME USES FOR AHF:

AHF is being used in increasingly larger quantities as an alkylation catalyst in the production of high octane gasoline. It is also used in the production of organic fluorine compounds, and in the synthesis of other organic compounds.

It can be diluted to form very pure aqueous HF acid for the preparation of high purity inorganic fluorine compounds.

As suggested by its physical and chemical properties, new uses as a condensation reagent and fluorinating agent are being continually reported. Current work indicates that it is of increasing interest in polymerization, isomerization and acylation reactions.

PRECAUTIONS IN HANDLING:

Anhydrous Hydrofluoric Acid and its water solutions attack the skin and tissues strongly, producing painful burns. Strong concentration of the vapors may cause irritation of the throat, constricted breathing, and possibly inflammation of the lungs. Contact with the acid and vapor should be carefully avoided thru the observance of proper safety precautions, and in cases of accidental contact, approved first aid measures should be promptly followed. For additional information, refer to the Manufacturing Chemists' Assoc. Manual Sheets TC-5 and H-2. Copies of these will be furnished by us on request.

SHIPPING CONTAINERS:

AHF is regulated by ICC as a hazardous article, being classified as a "corrosive liquid." The shipping containers specified by ICC are pressure vessels, as commonly used for compressed gases.

The containers now available from Penn Salt are:

CYLINDERS: Sizes—6 lbs. net, 100 lbs. net, and 230 lbs. net. Type—ICC Specification 3A480.

TANK CARS: Sizes—11½ tons net, 22 tons net, and 42 tons net. Type—ICC Specification 105A series.

SHIPPING CLASSIFICATION:

Corrosive liquid—ICC white label required on cylinders. ICC corrosive liquid placard required on tank cars.

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals
1000 WIDENER BUILDING, PHILADELPHIA 7, PA.
New York • Chicago • St. Louis • Pittsburgh • Cincinnati • Minneapolis • Wyandotte • Tacoma

Maintenance time reduced to a minimum

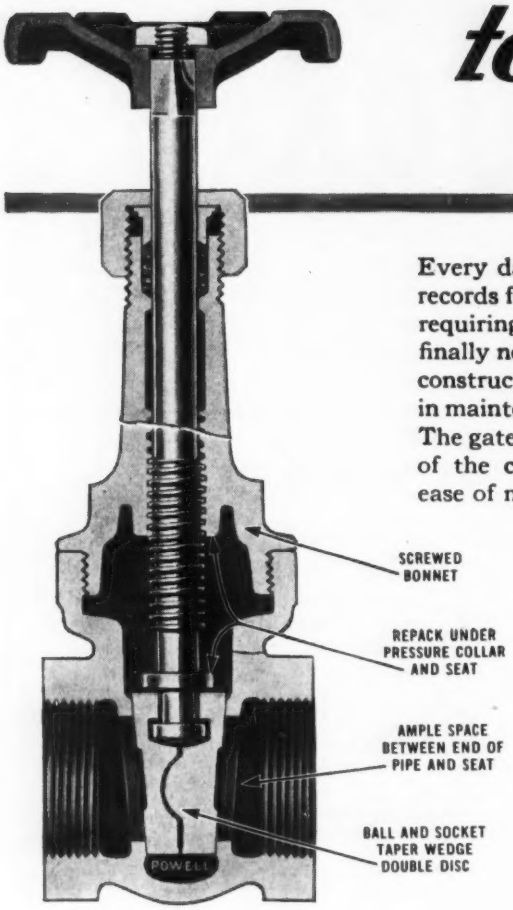

SCREWED BONNET
REPACK UNDER PRESSURE COLLAR AND SEAT
AMPLE SPACE BETWEEN END OF PIPE AND SEAT
BALL AND SOCKET TAPER WEDGE DOUBLE DISC
POWELL

Fig. 500
BRONZE "U. S." GATE VALVE

Every day, Powell Valves are piling up records for continuous operation without requiring maintenance. And when they finally need attention, Powell design and construction is such that the time spent in maintenance is reduced to a minimum. The gate valves shown here are examples of the complete Powell Line in which ease of maintenance is always a feature.

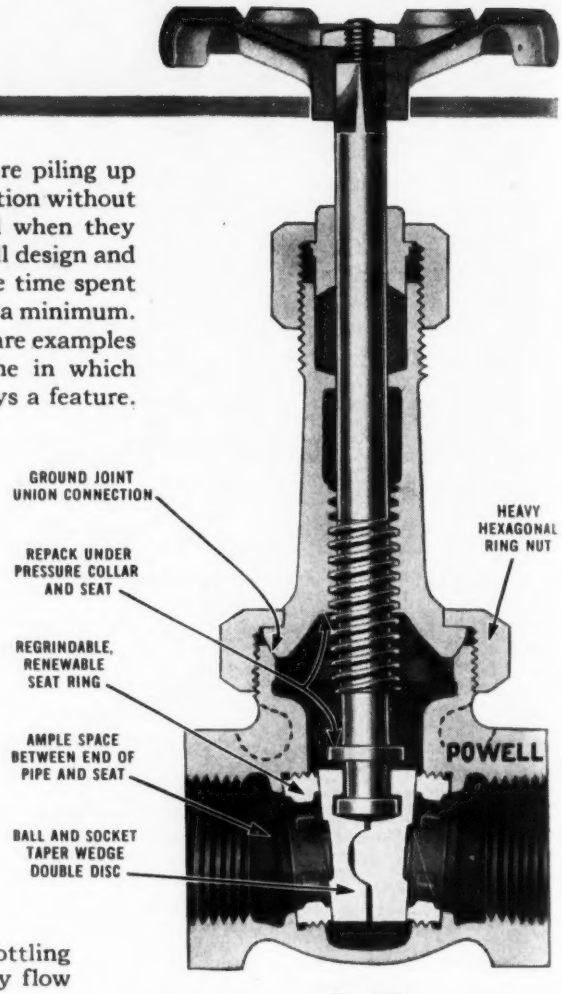

GROUND JOINT UNION CONNECTION
HEAVY HEXAGONAL RING NUT
REPACK UNDER PRESSURE COLLAR AND SEAT
REGRINDABLE, RENEWABLE SEAT RING
AMPLE SPACE BETWEEN END OF PIPE AND SEAT
BALL AND SOCKET TAPER WEDGE DOUBLE DISC
POWELL

Fig. 1375
BRONZE "WHITE STAR" GATE VALVE

In all installations where pressure drop is undesirable and throttling is unnecessary, the gate type of valve, with its full straightway flow area through the body, should be used.

Fig. 500 is Powell's answer to the widespread demand for a sturdy small bronze gate valve where initial cost is a consideration. With its readily removable screwed-in bonnet it is easy to reface the seats and disc or replace the disc if necessary. The taper wedge double disc, with its Powell-designed ball and socket action, readily adjusts itself to any inclination of the seat faces caused by refacing, thus effecting a tight closure. Since the seats are cast integral with the body, this valve will give dependable service as long as sufficient metal remains in the seats to permit refacing.

For *extra long life*, Fig. 1375 is recommended. The ground joint union connection makes it especially easy to remove the bonnet assembly from the body to reface or, if necessary, to replace the disc and renewable seats. This may be done any number of times without any distortion of the body neck, such as might occur with a screwed-in bonnet. Both disc and seats are made from a special hard nickel-bronze alloy which resists wear over a long period of time. When these parts will not take further refacing, they can be readily replaced with new ones, thus greatly prolonging the life of this valve.

All Powell Valves that require repacking are provided with a specially machined cut-off to permit repacking under pressure when wide open.

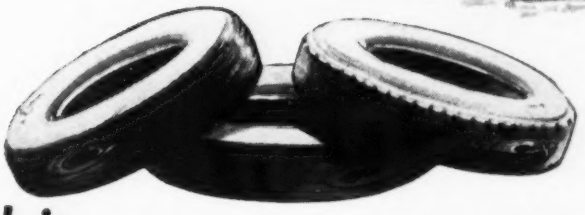
The Wm. Powell Co.
Dependable Valves Since 1846
Cincinnati 22, Ohio

POWELL VALVES

mechanicals

B.R.T.*

for footwear



reclaim

DUAL PURPOSE SOFTENERS AND EXTENDERS

SPECIFICATIONS

	B.R.T. No. 3	B.R.T. No. 4	B.R.T. No. 7
Specific Gravity			
25°C/25°C	1.15 to 1.20	1.15 to 1.20	1.20 to 1.25
Specific Viscosity, Engler			
50 ml at 40°C	13 to 18		
50 ml at 50°C		15 to 30	
50 ml at 100°C			6 to 9
Insoluble in Carbon Disulfide			
% by weight	4 to 10	4 to 10	15 to 20
Water			
% by volume (maximum)	3	3	0.1
Distillation			
to 170°C % by weight (maximum)	5	2	1
to 270°C % by weight (maximum)	25	20	13
to 300°C % by weight (maximum)	35	30	25
Softening Point			
Ring and Ball Distillation Residue at 300°C Degrees Centigrade	30 to 60	35 to 65	35 to 65

Through his selection of B.R.T. softeners, the rubber compounder is offered a choice of refined coal-tar plasticizers with different viscosities, distillation ranges and carbon disulfide insoluble contents. Serving both as softeners and extenders, the value of these products is indicated by their use throughout the rubber industry for mechanicals, footwear and reclaiming.

THE BARRETT DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK 6, N.Y.

The Barrett Company, Ltd.

5551 St. Hubert St., Montreal, Que.

Barrett

*Reg. U.S. Pat. Off.

ONE OF AMERICA'S GREAT BASIC BUSINESSES

local boy makes good!

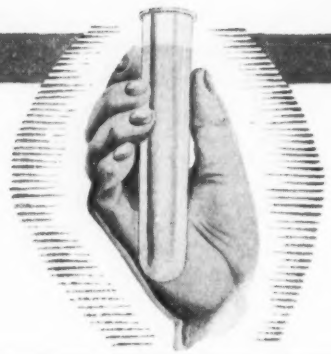
--- Red Oil

Red Oil, a domestic product manufactured by HARDESTY, is replacing many oils heretofore imported from abroad. The uncertainty of constant supplies of imported products even in peace times has caused many unnecessary delays.

Wartime shortages in these materials have taught American consumers many lessons. In the case of Red Oils, these consumers have learned of the many advantages offered by this domestic product and their post-war plans include the continuing use of Red Oil instead of the more expensive products.

If you have a process in which Red Oil may fit, we urge you to "dig into" the possibilities offered by Red Oil. See HARDESTY for complete details.

STEARIC ACID RED OIL GYLCERINE PITCH WHITE OLEINE
HYDROGENATED FATTY ACIDS ANIMAL AND VEGETABLE DISTILLED FATTY ACIDS

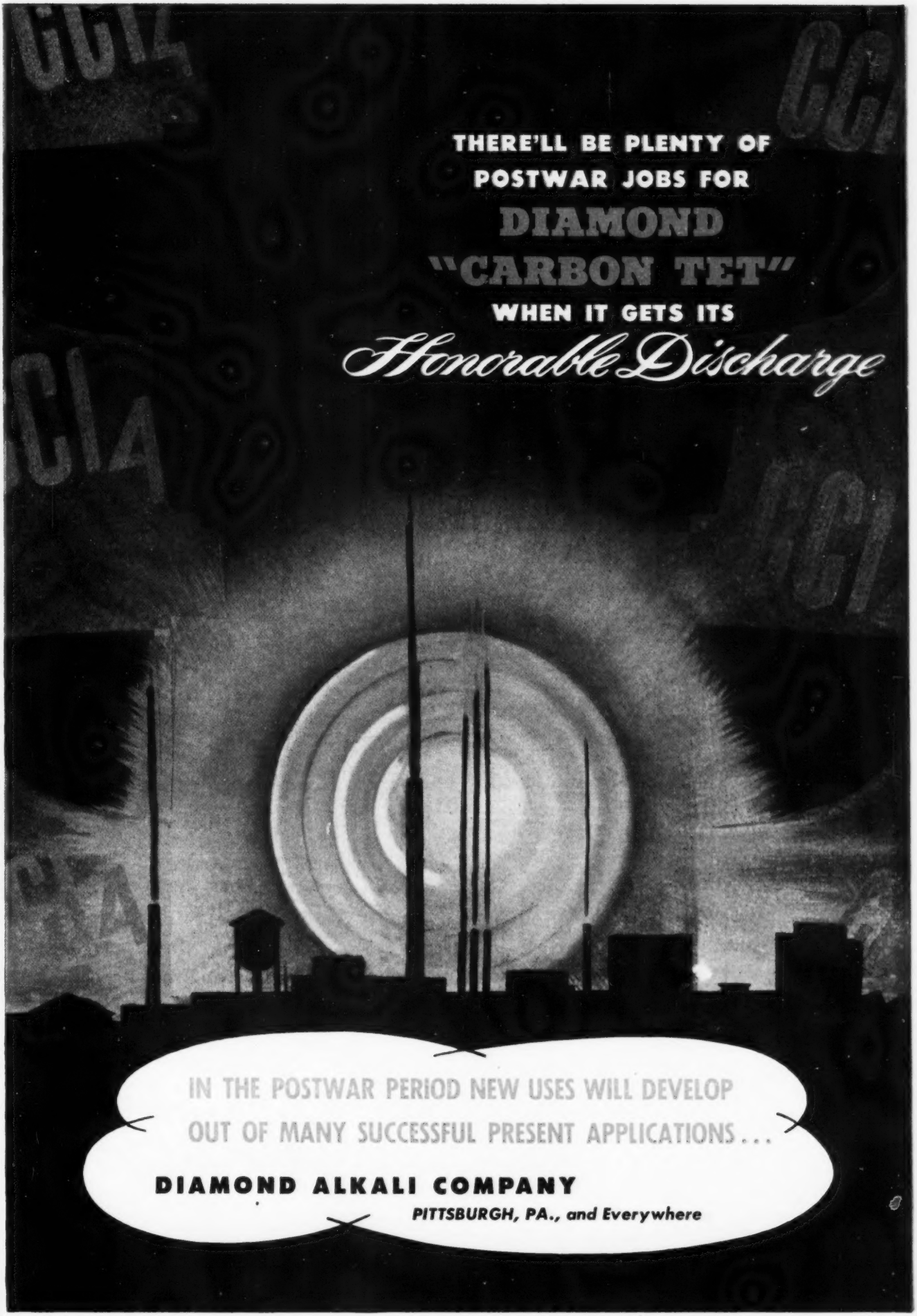


HARDESTY

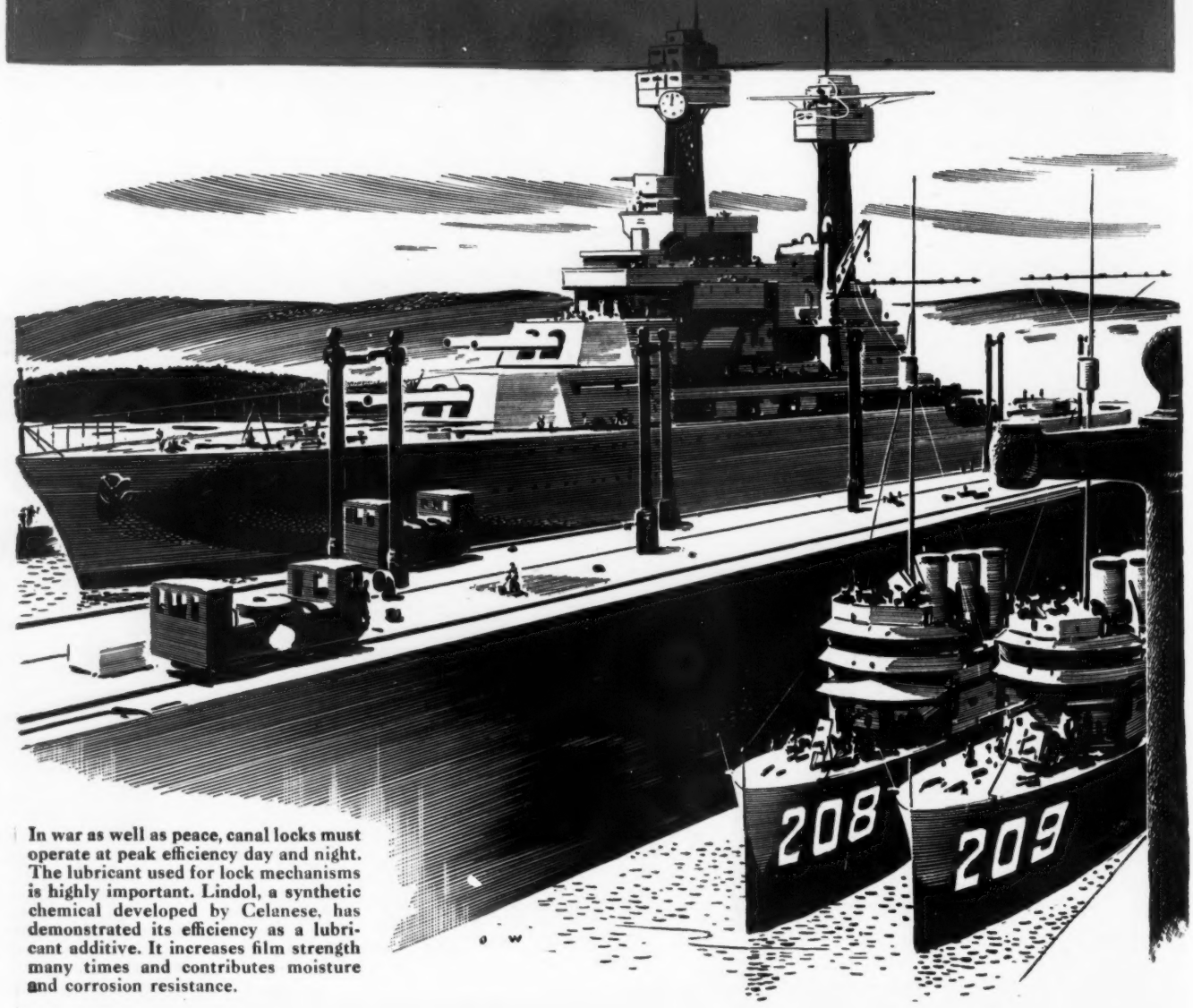
W. C. HARDESTY CO.

41 EAST 42nd STREET • NEW YORK 17, N.Y.

FACTORIES: DOVER, OHIO · LOS ANGELES, CALIF. · TORONTO, CANADA


THERE'LL BE PLENTY OF
POSTWAR JOBS FOR
DIAMOND
"CARBON TET"
WHEN IT GETS ITS
Honorable Discharge
IN THE POSTWAR PERIOD NEW USES WILL DEVELOP
OUT OF MANY SUCCESSFUL PRESENT APPLICATIONS...
DIAMOND ALKALI COMPANY
PITTSBURGH, PA., and Everywhere

Celanese* Chemicals



In war as well as peace, canal locks must operate at peak efficiency day and night. The lubricant used for lock mechanisms is highly important. Lindol, a synthetic chemical developed by Celanese, has demonstrated its efficiency as a lubricant additive. It increases film strength many times and contributes moisture and corrosion resistance.

CELANESE CORPORATION OF AMERICA

Once organic phosphates were "Just a footnote in the text book"

THE RANGE AND SCOPE of Celanese organic phosphates are typical of the results achieved through modern synthetics research. From these hydrocarbons derivatives Celanese has pioneered a group of compounds with many potentialities.

These products of intensive research have been of practical service to engineers seeking materials with specific properties to meet definite needs. Lindol*, Lindol M.P., Lindol E.P., Celluflex* M-142, Cellulube* have shown wide adaptability in meeting various requirements of industry.

As non-flammable *plasticizers* for plastics, vinyl compounds and insulation materials . . . as *water-in-oil* and *oil-in-water* emulsions for waterproof paper and fabric coatings, leathers, water soluble resins, wire drawing and heat transfer liquids . . . as non-flammable *lubricants* and *lubricant additives* for high pressure engines, diecasting machinery, electrical equipment, vacuum pumps and oxygen compressors, these Celanese compounds perform vital functions in a great many operational and manufacturing processes.

The development of organic phosphates demonstrates the ability of synthetics to accurately control chemical and physical properties. It is an example of the results obtained when materials are created for specific needs and purposes. Celanese Chemical Corporation, *A division of Celanese Corporation of America*, 180 Madison Avenue, New York 16, New York.

*Reg. U. S. Pat. Off.

PLASTICIZERS

ORGANIC PHOSPHATES

LUBRICANT ADDITIVES

INTERMEDIATES

DYE-STUFFS

TEXTILES • PLASTICS • CHEMICALS

KELCO ALGIN

Unlike other natural water soluble stabilizers which are apt to vary according to diversified conditions of growth — KELCO ALGIN is processed to *definite standards*. That's why KELCO ALGIN gives positive control over viscosity — to the exact degree you require in your product.

In the food field and throughout many industries, KELCO ALGIN is standardizing by stabilizing many famous products. It is used regularly in FOODS — TOOTHPASTES — INDUSTRIAL HAND CREAMS — HEALTH PRODUCTS — PHARMACEUTICALS — COLD WATER PAINTS — TEXTILE PRINTING PASTES — DISCHARGE PASTES — GUM WATER — PADDING OPERATIONS — DIRECT DYE PRINTING on RAYONS — LATEX ADHESIVE MIXTURES — BOILER WATER COMPOUNDS — and wherever else there is need for an always dependable stabilizer, suspending and bodying agent, or hydrophilic colloid.

KELCO
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REFINED ALGIN PRODUCTS

KELCO COMPANY

75 E. Wacker Drive
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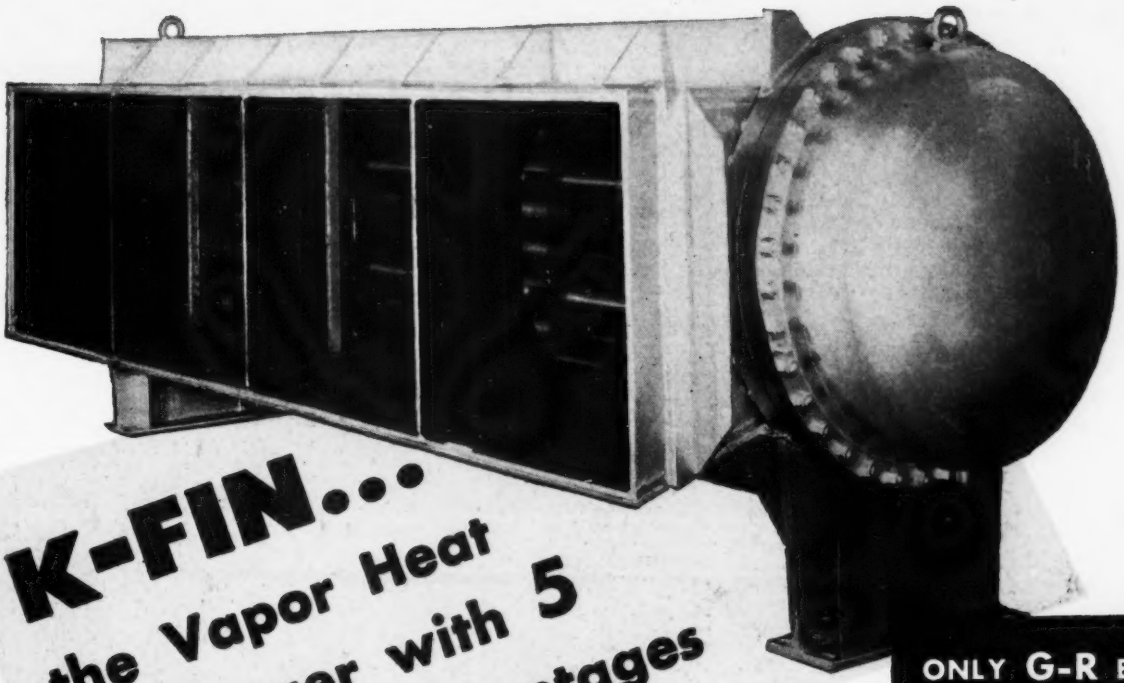
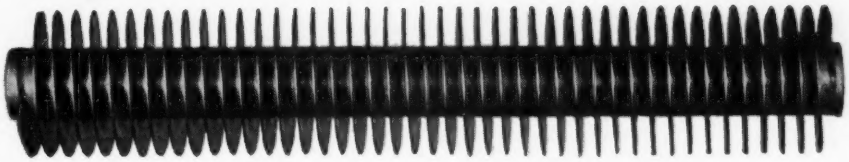


K-FIN... the Vapor Heat Exchanger with 5 Exclusive Advantages



Lowest vapor pressure loss through the shell . . .

Fewest tubes for a given duty . . .

Least possibility of leakage . . .

Rated capacity maintained for long periods without requiring tube cleaning . . .

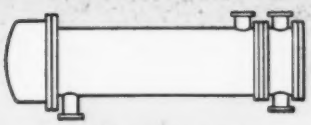
Speediest and easiest cleaning . . .

These five features of the K-Fin Vapor Heat Exchanger warrant your further study of this unit for services such as transfer of heat between heavy oil vapor under vacuum and furnace charge.

Complete information is contained in our Bulletin 1625, copy of which will be sent on request.

THE GRISCOM-RUSSELL CO.
285 Madison Ave., New York 17, N. Y.

ONLY G-R BUILDS THIS WIDE VARIETY OF HEAT TRANSFER APPARATUS



SHELL and BARE TUBE
Heaters, Coolers, Condensers, Heat Exchangers

G-FIN
Longitudinal-finned elements for greater heat conductivity

K-FIN
Helical-finned elements for vapors and gases

BENTUBE SECTIONS
with scale-shedding elements for hard or salt water

TUBEFLO SECTIONS
Non-clogging design for residuum and other dirty fluids

GRISCOM-RUSSELL

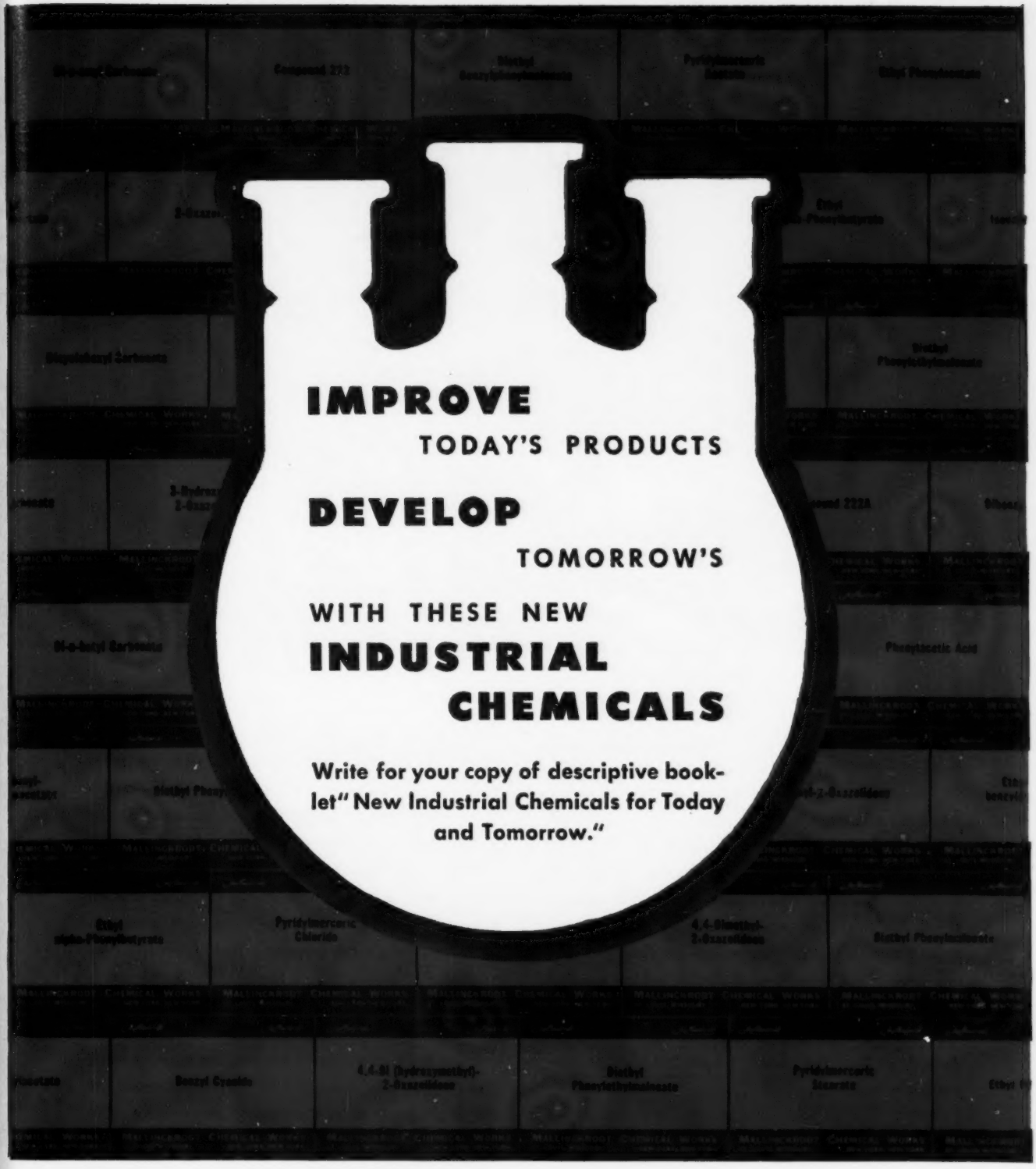
Pioneers in Heat Transfer Apparatus

PLAN NOW FOR POST WAR COMPETITION

HEEKIN CANS

ANY SHAPE · ANY SIZE · ANY COLOR · ANY QUANTITY

THE HEEKIN CAN CO., CINCINNATI 2, OHIO



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MALLINCKRODT CHEMICAL WORKS

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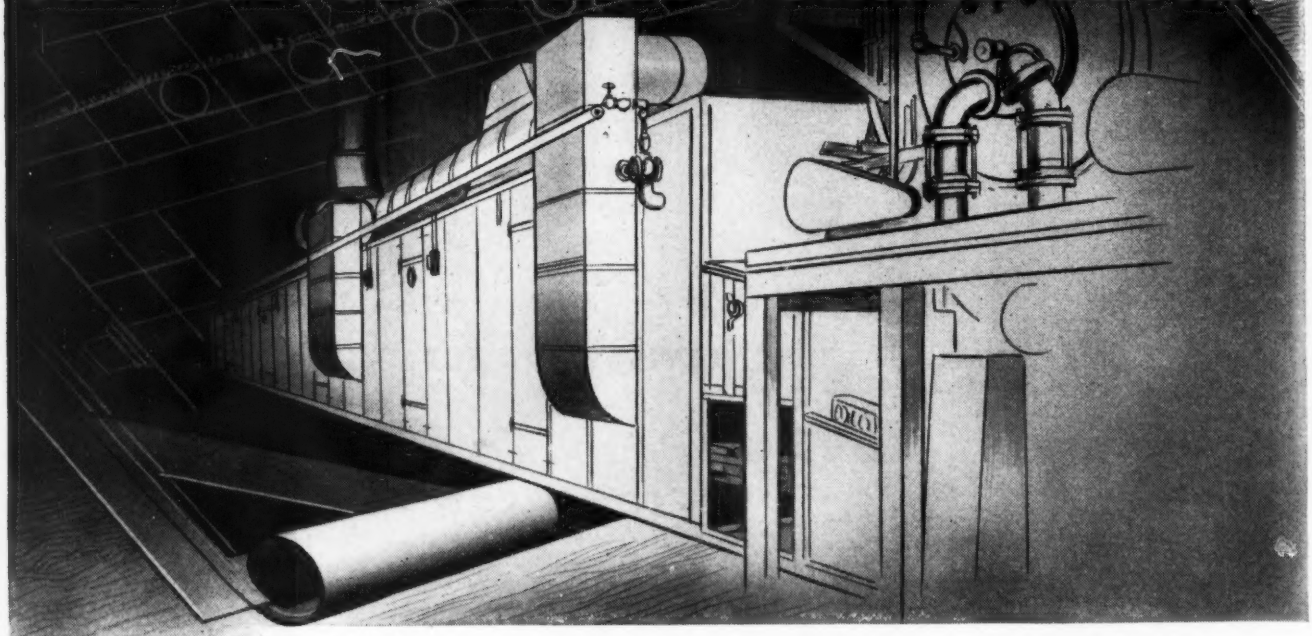
CHICAGO • PHILADELPHIA • LOS ANGELES • MONTREAL

The Story of the Inquiry
THAT REVOLUTIONIZED STARCH DRYING



On December 17, 1935 the Sales Manager of our Special Dryer Division wrote a letter in answer to an inquiry from a midwestern starch manufacturer. As a direct result of that letter, the method of starch drying throughout the entire industry, has been virtually revolutionized in less than ten years. The manufacturer, who was at that time drying starch in a truck-tray dryer, was in search of a continuous drying system that would increase production and at the same time maintain a high quality finished starch. The system had to be such that case-hardening of the finished product would be prevented, so that the starch would be readily dispersable in water.

Tests were conducted and recommendations made. Together the engineers of Proctor research laboratories and engineers from the manufacturer's plant worked—until eventually the correct system was worked out. The sales contract for the first machine was written nearly one year after the original inquiry came to our attention. In accordance with our recommendations a Proctor Seven Unit Single Conveyor Dryer was installed. The capacity of the machine is at the rate of 2080 pounds, commercial dry weight, per hour. Starch is delivered to the dryer with a maximum moisture content of 45.4% and is dried to a moisture content of 12%, commercial dry weight, in an average drying time of 15.6 minutes. On all counts, this drying system met the high requirements set by the manufacturer. Since the installation of this machine, two more have gone into the plant of the same company. Today, every major producer of corn starch in the country, is operating a system like this—modified only to meet production requirements. An average of 960 tons of starch is dried in Proctor Dryers all over the country each day. If you are engaged in the manufacture of starch and not now thoroughly acquainted with this system — investigate it without further delay.

This is just one more actual case of how Proctor engineers are ready, willing and able to assist with the solving of specialized drying problems. If drying is a part of your manufacturing process and you even mildly suspect that there is a better way to accomplish your drying—let our engineers work with you toward improving your method.

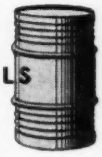
PROCTOR & SCHWARTZ · INC.

SEVENTH STREET & TABOR ROAD · PHILADELPHIA 20 · PA.

DIETHYLENE GLYCOL

Moistening agent for . . .

Solvent for . . .



Lubricant for . . .

Available in . . .

to

The Higher Polyethylene Glycols

. . . are bland, water-soluble, chemically stable compounds with applications similar to those of Diethylene Glycol. The Polyethylene Glycols of molecular weights up to 1,000 are liquids; the "Carbowax" Compounds, Polyethylene Glycols above 1,000 in molecular weight, are wax-like solids. Of special interest are the uses of these materials as water-soluble lubricants for rubber molds, textile fibers, and metal-forming operations.

Diethylene Glycol is a practically colorless, odorless liquid, that boils at 244°C. It is widely used as a hygroscopic agent to remove moisture from natural gas. Since it forms both mono- and di-esters, it may be used in the preparation of such compounds as diglycol phthalate and similar esters of the dicarboxylic acids. With the higher fatty acids it forms good emulsifying agents.

Further information on Diethylene Glycol is contained in the booklet "Glycols" (Form 4763). A copy will be sent on request.

BUY UNITED STATES WAR BONDS AND STAMPS

SYNTHETIC ORGANIC CHEMICALS

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York 17, N. Y.

"Carbowax" is a registered trade-mark of Carbide and Carbon Chemicals Corporation

NUMBER 2

PROPERTIES WHICH MAY SUGGEST NEW APPLICATIONS OF SONNEBORN PETROLATUMS

(Soft Type Micro-Crystalline Waxes)

IN YOUR PROCESSING OR MANUFACTURING OPERATIONS

The benefits you can obtain by the use of Sonneborn Petrolatums are suggested by the partial list of properties at the right. (Other properties were presented in an earlier issue.) Constantly broadening usage of these soft-type micro-crystalline waxes indicates that the applications are almost limitless.

In contrast to paraffin wax, which forms crystalline aggregates, petrolatum is amorphous, or, in a stricter sense, micro-crystalline. Its internal phase comprises *liquid* hydrocarbons and the external phase comprises *solid* hydrocarbons.

Sonneborn Petrolatums are readily available in three types — FONOLINE (soft), PROTOPET (medium soft), and PERFECTA (medium soft with high melting point). They are refined in a range of colors to suit various industrial purposes. Special types can also be made to individual specifications.

Sonneborn Petrolatums offer many interesting possibilities. Have our Department of Industrial Research tell you how one of these products can help you solve some current or future problem.

★ ★ ★

This is the second of two bulletins focusing industry's attention on the possibilities of Sonneborn Petrolatums for various processing or manufacturing operations. Reprints of the series will be supplied on request.

★ ★ ★

Please direct inquiries on specific problems to

DEPARTMENT OF INDUSTRIAL RESEARCH

L. SONNEBORN SONS, INC.

Refiners of Petroleum

88 LEXINGTON AVENUE · NEW YORK 16, N. Y.

*PROPERTIES OF SONNEBORN PETROLATUMS

- ☐ Protect metallic surfaces against rust and corrosion
- ☐ Freedom from odor
- ☐ Non-sweating
- ☐ Freedom from taste
- ☐ Free from resinous impurities
- ☐ Low rate of oxidation
- ☐ Will not become rancid
- ☐ Non-drying — non-staining
- ☐ Non-supportive to pathogenic bacterial and mold growth
- ☐ Sterile — Fungistatic
- ☐ Insect-repellent

**Properties listed are representative of Sonneborn petrolatums in general, but this does not necessarily mean that all of these properties exist in any one grade.*

RANGE OF PHYSICAL CHARACTERISTICS

Saybolt Melting Point: 105°F.-130°F.
A.S.T.M Melting Point: 110°F.-137°F.
A.S.T.M. Consistency: 160-240.
Saybolt Viscosity: 45-75 @ 210°F.
Flash Point: 360°F.-430°F.
Specific Gravity: 0.840-0.870 @ 60°F.
Color: Amber to White.

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and

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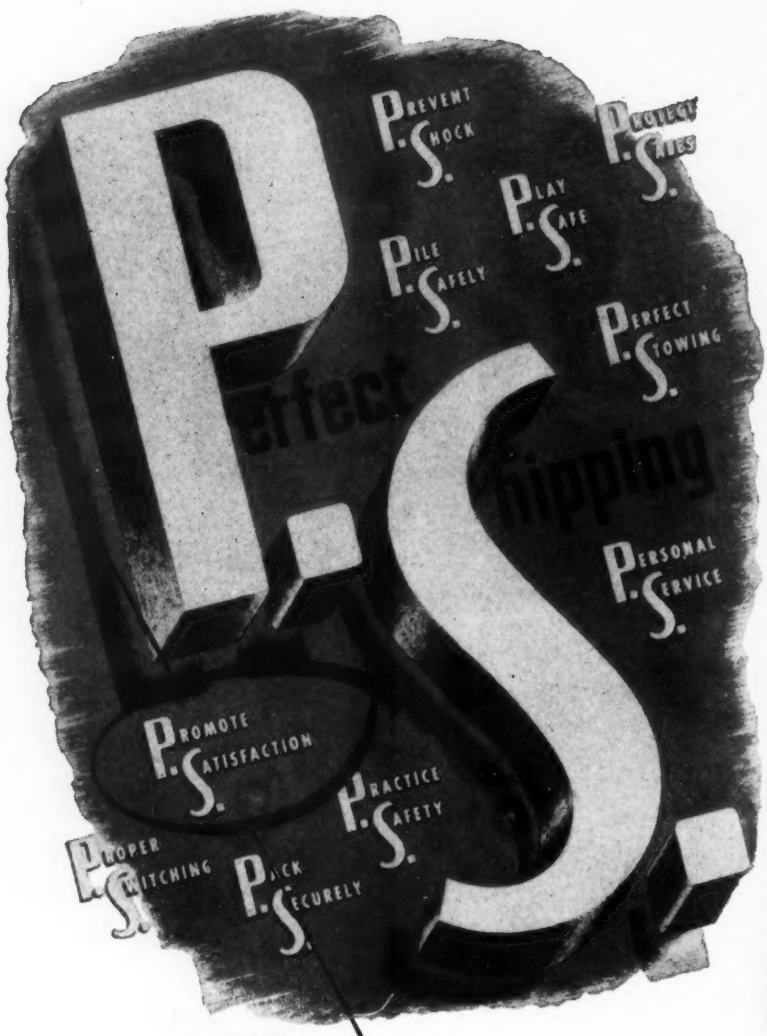

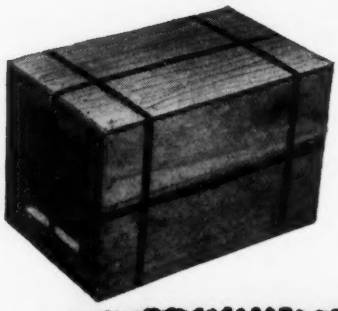

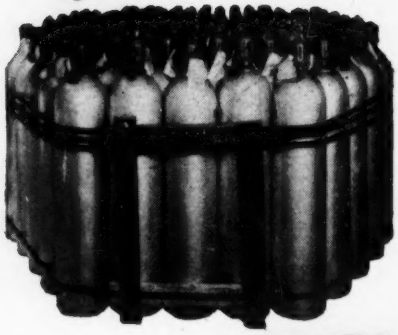

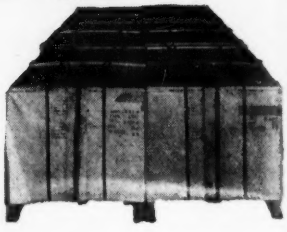

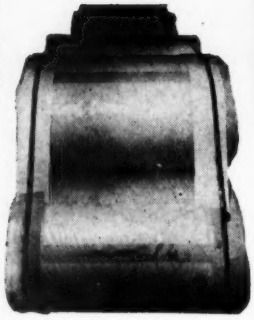

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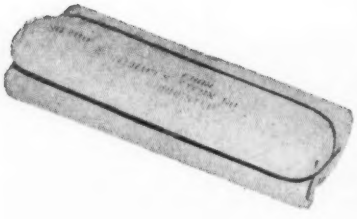

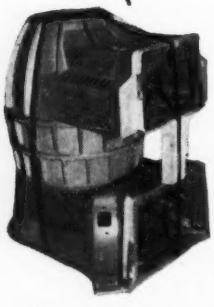

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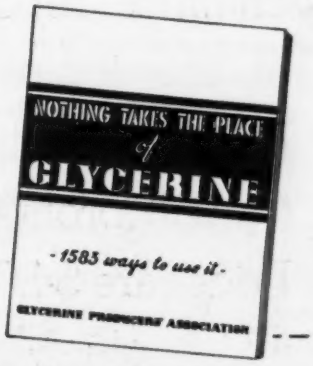

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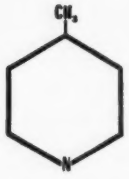

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SHIPPING CONTAINERS: 400-lb. drums; 40-lb. cans.

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Name	Formula	Mol. Wt. (calcd.)	Sp. Gr. at 20/20° C.	Boiling Range °C.	Solubility in		
					Water	Ethanol	Benzene
Di-n-propylamine	$(CH_3CH_2CH_2)_2NH$	101.2	0.741	105-109	Partial	Complete	Complete
Diisopropylamine	$[(CH_3)_2CH]_2NH$	101.2	0.726	81-85	Partial	Complete	Complete
Diisobutylamine	$[(CH_3)_2CHCH_2]_2NH$	129.2	0.746	136-140	Slight	Complete	Complete
Di-sec-butylamine	$(CH_3CH_2CHCH_3)_2NH$	129.2	0.783	134-137	Slight	Complete	Complete

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MONOETHYLAMINE DIETHYLAMINE TRIETHYLAMINE

DIETHYLAMINOETHANOL
ETHYL MONOETHANOLAMINE ETHYL DIETHANOLAMINE
MIXED ETHYL ETHANOLAMINES
DIBUTYLAMINOETHANOL
BUTYL MONOETHANOLAMINE BUTYL DIETHANOLAMINE
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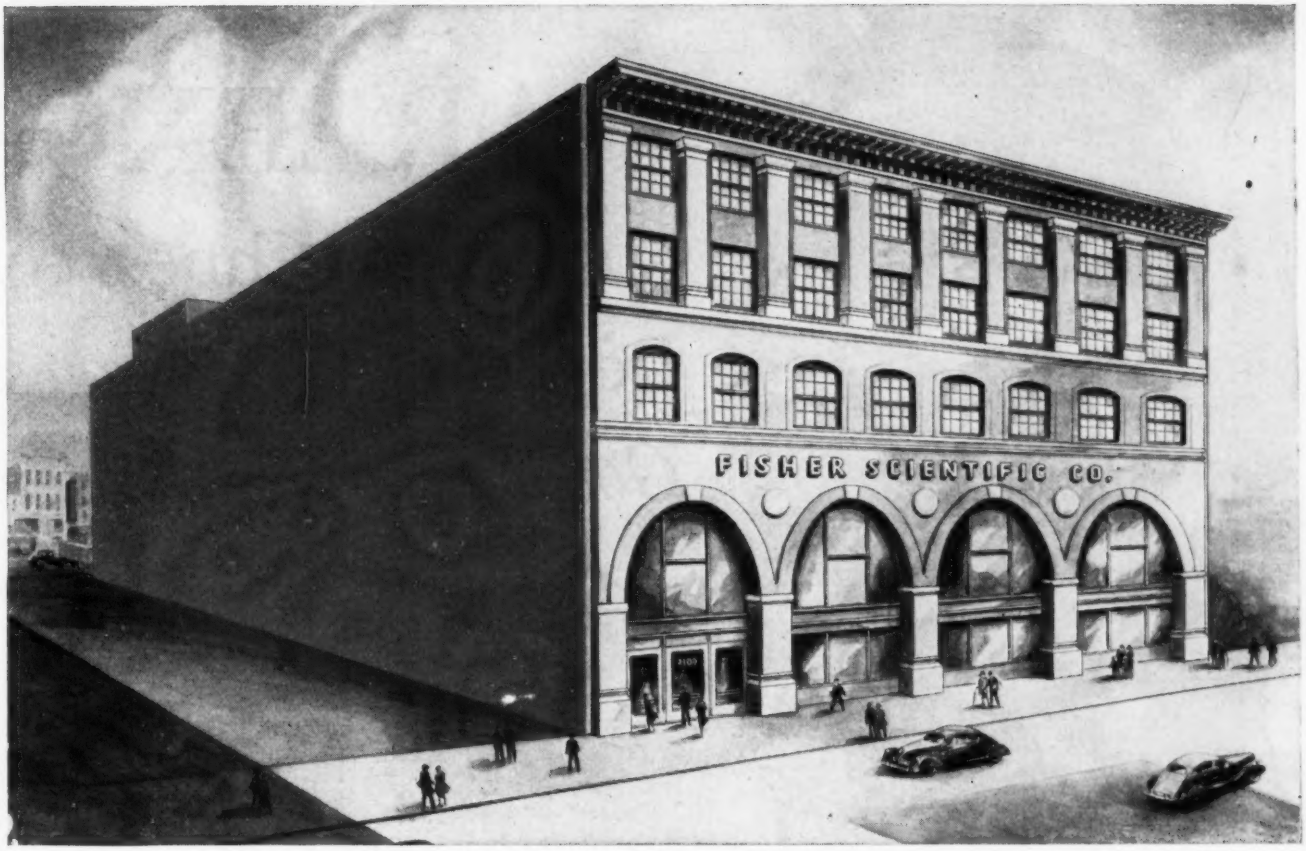

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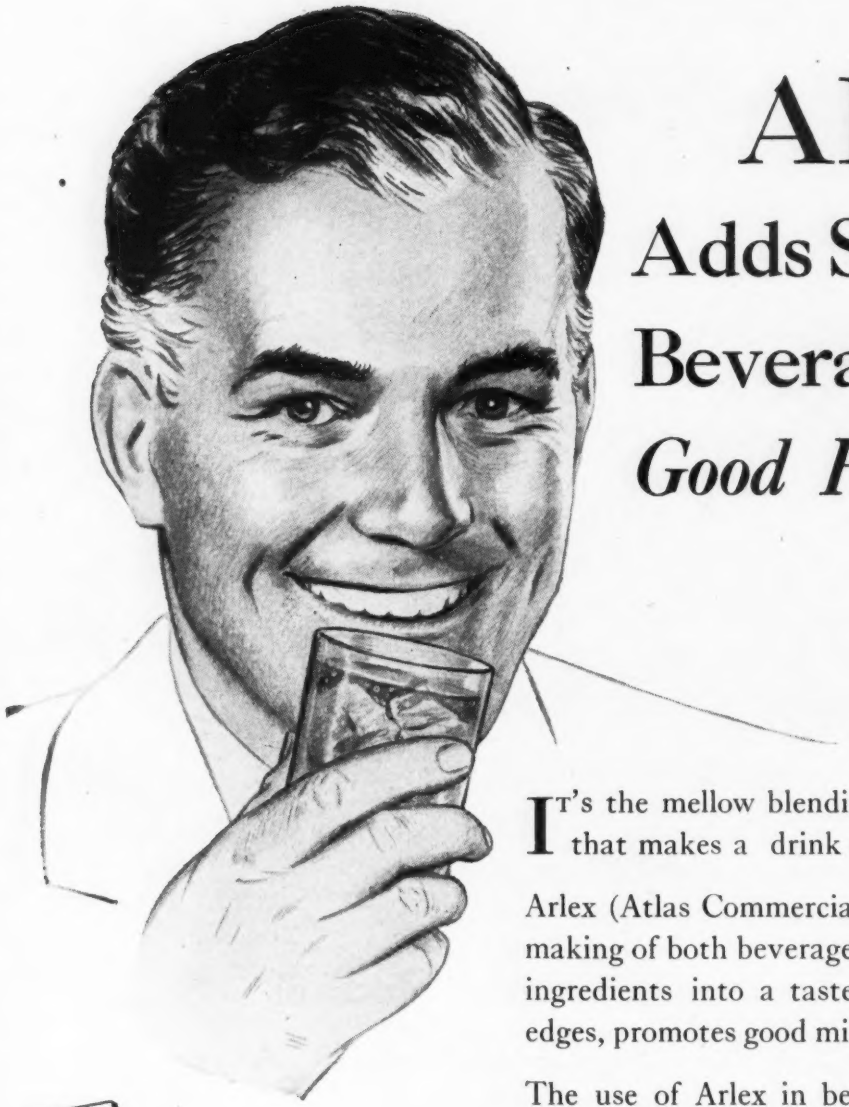

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It's the mellow blending of carefully chosen ingredients that makes a drink a refreshment.

Arlex (Atlas Commercial Sorbitol Solution) is used in the making of both beverages and foods—it blends the various ingredients into a taste-tempting whole, smooths rough edges, promotes good mixing, and adds to your enjoyment.

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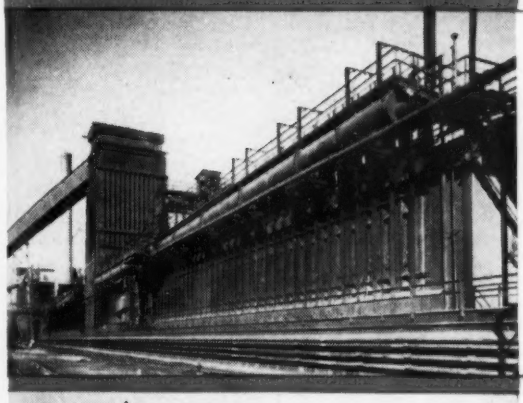
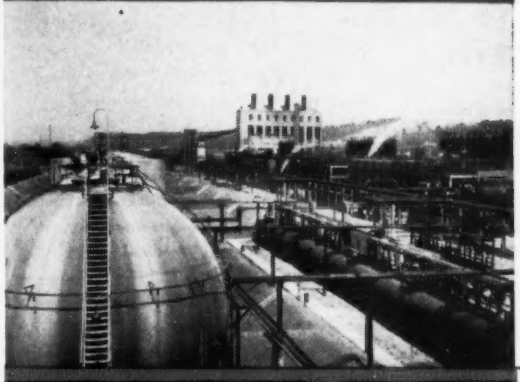
1. Coal is the Great Chemical Reservoir—Two-thirds of the synthetic resins produced in the U. S. in 1942 (the last year for which published figures are available) were based on coal carbonization products. Koppers has been one of the nation's leaders in the carbonization of coal and in the utilization of the products of coal carbonization.



2. The Coke Oven Unlocks Chemicals in Coal—Coal burned under a boiler or in a furnace is consumed. Coal used in a modern coke oven is distilled or carbonized. From the gas and vapor come many chemicals essential to modern life and industry. Koppers is the largest American builder of coke ovens.



3. Koppers Plants Help Recover and Refine Chemicals—Koppers designs and builds many of the plants which recover and refine coal tar chemicals which go into synthetic rubber, plastics, varnishes, dyes, solvents, motor fuel, disinfectants, medicines, flavors, explosives, and other products. This photo shows a synthetic rubber chemical plant built and operated for the Federal Government by Koppers.

4. Koppers is One of the Principal Sources of Coal Tar Chemicals—Koppers serves the chemical industry by producing phenol, cresols, Xylenol, benzene, toluene, xylene, pyridine, picolines, lutidines, quinoline, other tar bases, naphthalene, tar acid oils, and other products.

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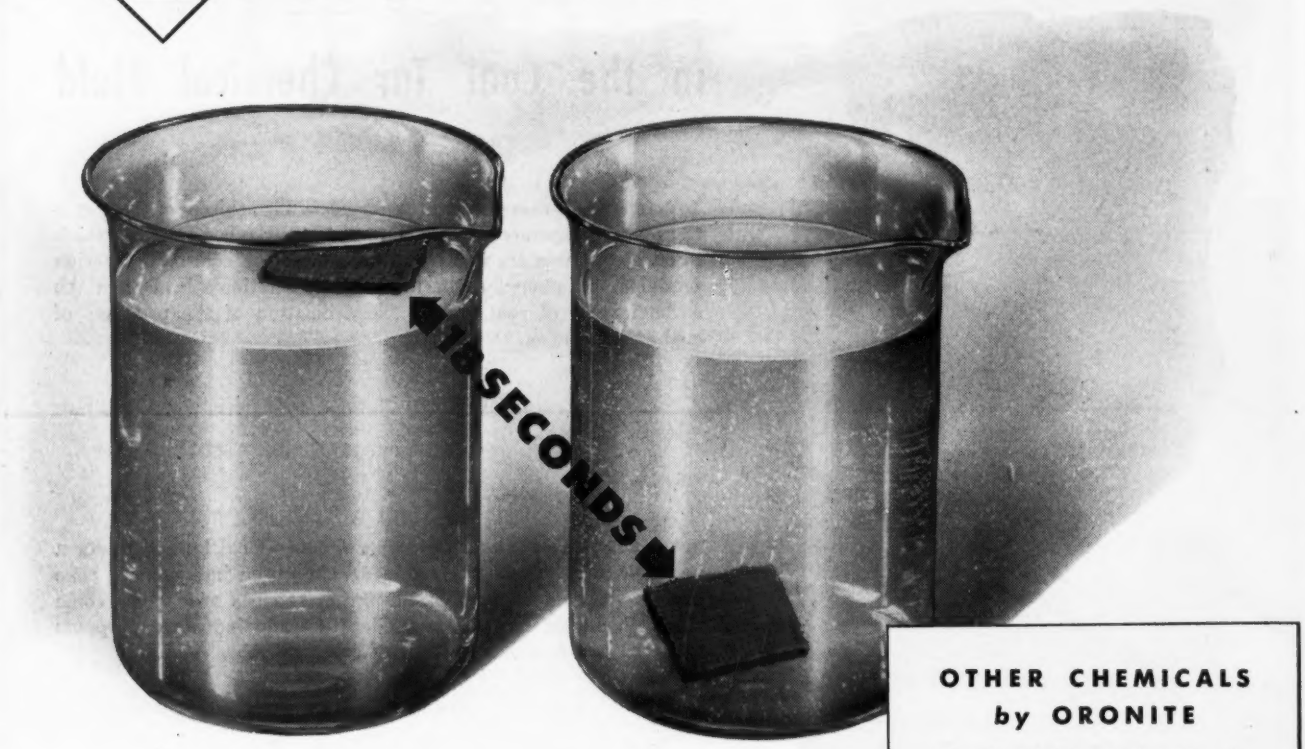

Rapid Wetting Time...Quick Penetration... ORONITE WETTING AGENT HAS BALANCE

Oronite* Wetting Agent is a semi-fluid product, light brown in color, consisting of a controlled combination of petroleum sulfonates selected to give a high degree of both wetting and penetrating power. The wetting properties of this product are unaffected even by hard water and acid solutions. Oronite Wetting Agent is stable in acid solutions at high temperatures. Its excellent wetting-out characteristics make it inherently superior for a great many industrial uses.

TYPICAL TESTS OF ORONITE WETTING AGENT

Content by Weight:		ASTM Color (of 5% solution in distilled water)	1½
Sodium sulfonate (by difference)	67.50%	pH (of 1% solution in distilled water)	7
Water by distillation	32.00	Wetting Time (0.5% solution with cotton duck), seconds	18
Sodium sulphate	0.40		
Water insoluble	0.03		

Write for technical bulletin "Oronite Wetting Agent" which contains comprehensive data and information about the product and its many uses. Laboratory samples will be sent without cost or obligation.

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Oronite Sodium Sulfonates, derived from petroleum sulfonic acids, are used as emulsifiers, emulsion breakers, anti-rust compounds, fat-splitting agents, metal cleaners; in oil emulsions, insecticides and sprays.

Oronite Naphthenic Acids are available in several grades for use in the manufacture of detergents, greases, water soluble oils and wood preservatives, and as flotation agents.

Oronite Aliphatic Acids have valuable froth control properties in the flotation treatment of many types of ores.

Oronite Drying Oil Extenders are neutral unsaturated hydrocarbons suitable for use with all drying oils, in oleo-resinous varnishes, paints, enamels, adhesives, binders and plastics.

Oroplast is a sulfur-reactive petroleum product specially developed for use as a compounding ingredient for natural and synthetic rubbers.

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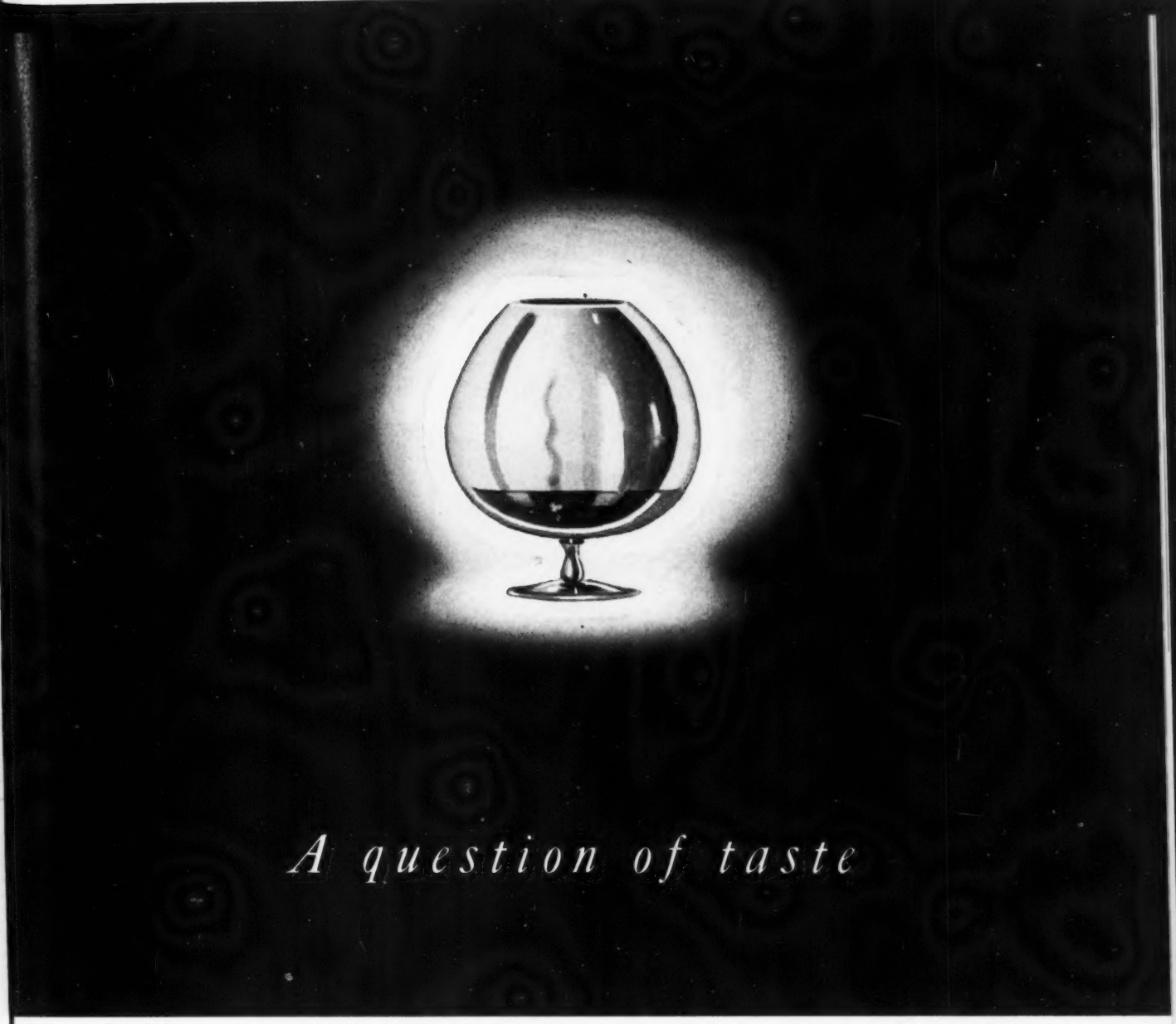

A question of taste

Psychologists recognize only 4 taste sensations, salt, sweet, sour, and bitter. Other taste sensations are actually odors recognized by the sense of smell and frequently erroneously described as taste. For example, in water purification, a consumer may say that water tastes fishy, earthy, musty, etc., but these, instead of being tastes, are actually odors.

Activated carbon is finding much wider application for removal of objectionable odors from many products. In the United States and Canada, over 1200 water plants have used Nuchar Activated Carbon for removing odors from their water supplies, while in the alcoholic beverage field, Nuchar is widely used in the treatment of wine and whiskey for improvement of odor and flavor. Many producers of whiskey even prior to the war, adopted Nuchar as standard practice in removing objectionable odors from freshly produced whiskey. At the present time Nuchar is also widely used for deodorizing neutral spirits employed in blending operations.

In chemical operations, foreign odors may be a result of atmospheric contamination from nearby plants or from odorous materials utilized within the plant itself. Foreign odors may also enter the process in the raw material or in various products employed in the chemical operations. The wide variety of compounds of an odorous nature which are capable of being removed by activated carbon certainly justifies consideration of Nuchar wherever odors may be a problem in the chemical industry.

Nuchar Active Carbons ★ Snow Top Precipitated Calcium Carbonate ★ Abietic Acid ★ Lignin ★ Indusoil Distilled Tall Oil Sulphate Wood Turpentine ★ Liquid Caustic Soda ★ Chlorine ★ Tall Oil Pitch ★ Ligro Crude Tall Oil

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The Dorrco Slaker does the work of *both* slaker and classifier. It is a single, self-contained unit. Operation is simple and safe, and overall installation costs are lower than for usual two-unit layouts. Further economies occur in operation and maintenance.

INSTALLATION ECONOMY The Dorrco Slaker is complete, ready to bolt to the floor. No foundations are required, as with other type slakers; there is no extra expense for erecting connecting launders between slaker and classifier because the Dorrco Slaker is all one unit. All protective hoods and covers are provided. A competent Dorr field engineer oversees Dorrco Slaker installations.

OPERATING EFFICIENCY Adequate provision is made in the classifier section of the Dorrco Slaker for removing unusual quantities of grit. Fine separations are assured by the Dorrco Slaker's ample pool area and volume.

LOW MAINTENANCE COST Tank liners of the Dorrco Slaker are durable white iron. Long life even under severe abrasive and corrosive conditions is therefore assured before replacements become necessary—*and Dorrco tank liners are replaceable.* When replacements are necessary, they are less expensive than with units which require complete new tanks or drums. Another low-maintenance feature of the Dorrco Slaker is the complete absence of submerged bearings exposed to caustic solutions and grit.

DORRCO Lime Slakers are made in six standard sizes, with capacities up to 200 tons of CaO per 24 hours.

7906

Communicate with the nearest DORR office for further information.

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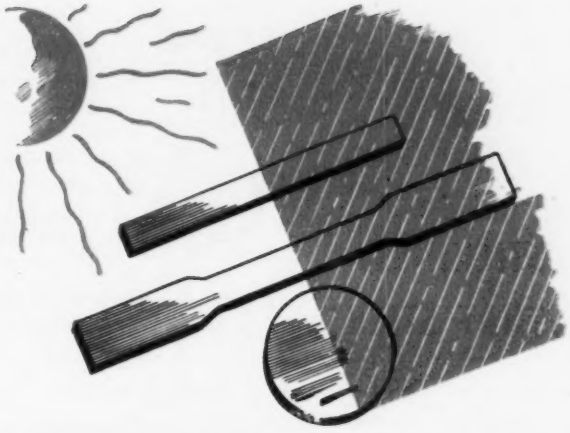
STICKINESS THAT STICKS. With Hercules' Staybelite Esters as tackifiers in the synthetic rubber used, wartime adhesives stay "alive" even longer than those of pre-war rubber. These tackifiers are non-reactive with both synthetic elastomers and pigments. Details on next page.



THERMOPLASTICS STAY PUT. Accelerated plastics research, demanded by war needs, has meant marked improvements in the dimensional stability of the cellulosics. Tests show how these improvements produce plastics that withstand high temperatures and humidities. See next page.

CUES AND CLUES

for improved products

ROSIN-RESIN SAVER. From the wood of the Southern long-leaf pine comes still another Hercules product to help beat wartime material shortages. Its name is Vinsol Resin—a low-cost extender, modifier, or replacement for many natural and synthetic resins. Turn page for details.

LENS PROTECTOR. Lacquer's toughness and durability is serving in many ways to keep existing equipment in service. Unique is a transparent coating on welders' goggles, to protect glass lenses from scratch burns. New coatings are easily applied on the spot. Please see next page.

TO help expedite your development of new and better products, or the improvement of existing ones, Hercules presents the second edition of CUES AND CLUES. If these timely reports on Hercules' materials and their uses suggest a solution to one of *your* problems why not get in touch with us today? Immediate attention will be given to your inquiry on any material. Write Hercules Powder Company, 992 Market Street, Wilmington 99, Dela.

HERCULES

SEE NEXT PAGE FOR DETAILS

1 STICKINESS THAT STICKS

Staybelite* Esters are the esters of hydrogenated rosin, with graded melting points and hardnesses. They differ from the rosin esters in being essentially non-oxidizing. Staybelite Esters are soluble in all commonly used solvents, except water and alcohol. They exhibit wide compatibility with resins, waxes, plasticizers, film-formers.

Because of these characteristics, they have been widely accepted as stable tackifiers for pressure-sensitive adhesives made with synthetic rubber. Such adhesives, for surgical tapes, have long shelf-life, non-toxicity, do not discolor. Masking and wrapping tapes made with them are easily removed without leaving a mark. Synthetic rubber cement, tackified with Staybelite Esters, meets all requirements in shoe manufacture, contributes to waterproofness.

When requesting information please describe your adhesive problems.

2 THERMOPLASTICS STAY PUT

The emphasis in plastics has shifted from beauty and glamor to strength and endurance. This new approach has brought about the development of properties which will make for better postwar plastics.

Hercules has prepared a new technical booklet, which lists and describes the results of dimensional stability tests on cellulosic plastics at high temperatures and high humidities—simulating tropical conditions.

The data indicate that cellulose acetate (regular or high acetyl, as conditions may warrant) is satisfactory for most uses, and that ethyl cellulose is outstanding for toughness and stability under more severe conditions.

Color sketches, photographs, four comprehensive tables, an explanation of test conditions, and a discussion of data contained in the sketches, make this booklet a comprehensive source of engineering data.

3 ROSIN-RESIN SAVER

Vinsol* Resin is dark-colored, has a high melting point (234° F. to 239° F. Hercules Drop Method). It is largely insoluble in petroleum solvents, but is soluble in alcohols, ketones, and esters. Vinsol Resin is available in lump, flake, or pulverized form, or as a stable emulsion.

Because of its compatibility with many natural and synthetic resins, and its extremely low cost, Vinsol Resin offers the plastics industry a valuable extender or replacement for critical materials. To such compositions it brings excellent electrical properties, oil resistance, hardness, good finish.

Vinsol Ester Gums, for use with lacquers, varnishes, floor tile, etc., are available at comparably low cost.

Other diversified uses include air entraining agents for Portland cement, stains, adhesives, paper impregnants, asphalt emulsions.

4 LENS PROTECTOR

Hercules produces high-quality nitrocellulose for manufacturers who make lacquers for industrial consumers. Among the latest developments, born of long research by Hercules and the protective-coatings industry, are new-type high-solids lacquers. They carry more film per coat, thus appreciably reducing spraying costs. And they air-dry quickly without expensive baking equipment.

High-solids lacquers will be available in lustrous colors and effects to meet every finishing need . . . beautiful pastels; rich, deep shades; shimmering iridescents; transparent. And with revival of color will come excellent protection against moisture, oils, acids, abrasion.

Descriptive literature will be supplied on request.

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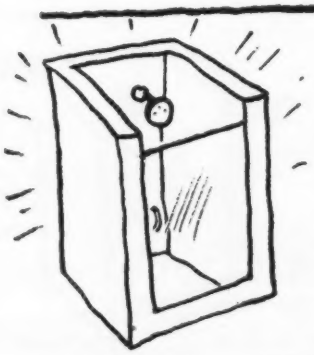
STAUFFER

ALLYL-ALCOHOL

$CH_2 = CH - CH_2OH$

Molecular Weight 58.05

Dozens of products, from radar domes to more colorful wall panelings, will benefit from the availability of allyl alcohol. Commercial scale production of this base chemical is new. Perhaps you have a problem it can help to solve.



For low-pressure laminating allyl alcohol provides esters that form required resins. Laminates of cloth, with the strength characteristics of metal, can now be made.

Casting of clear sheets in any desired shape is one of the many end-uses where allyl alcohol plays an important part.

As raw material for colorless enamel bases, allyl alcohol opens the door to harmonizing colors for refrigerators, stoves and the deep-freeze units of postwar.

Inquiries about allyl alcohol are invited from plants with problems. We may be able to widen your horizons.

SPECIFICATIONS

Purity	Minimum 98% allyl alcohol by weight (Impurities are largely diallyl ether and water)
Specific Gravity 20°/20° C.	0.852 to 0.855
Color	Maximum 25 platinum cobalt (Hazen) standard
Water	Maximum 0.5%
Distillation Range (A.S.T.M. D268/33)	Below 94° C. None Above 99° C. None At least 90% distills between 95° C. and 98° C.
Water Solubility	Completely miscible with 1-19 volumes distilled water
Weight	7.11 lbs. per gallon at 20° C. (approx.)

PHYSICAL PROPERTIES

Several of the physical properties of allyl alcohol are given in the following table:

Specific Gravity at 20°/4° C.	0.8520
Boiling Point at 760 mm.	96.9° C.
Melting Point	−129° C.
Flash Point, Tag Open Cup	85° F.
Tag Closed Cup	72° F.
Vapor Pressure at 0° C.	4.2
10° C.	8.8
20° C.	17.3
30° C.	32.4
Specific Heat	0.665 (20° −95° C.)
Refractive Index, N_D^{20}	1.4135
Coefficient of Expansion	0.000572 per °F.
Latent Heat of Vaporization	163.8 gm. cal. per gm. (at boiling point)
Heat of Combustion	7,620 gm. cal. per gm.
Lower Limit of Inflammability	3.0 volume %

Azeotropic Data. Allyl alcohol forms a constant boiling mixture with water at 88.6° C., containing 72.3% by weight of compound.

For further properties and uses communicate with either of the addresses below.

SHELL CHEMICAL Division of SHELL UNION OIL CORPORATION
100 BUSH ST., SAN FRANCISCO 6, CALIFORNIA
R. W. GREEFF & CO. *Eastern Sales Agent* 10 ROCKEFELLER PLAZA, NEW YORK 20. TRIBUNE TOWER, CHICAGO 11

NEVILLAC 10° Plasticizer

SPECIFICATIONS AND PROPERTIES

Specific Gravity at 15.6/15.6°C	1.075 to 1.10
Weight per gallon (average)	9.15 pounds at 15.6°C
Distillation Range	Essentially between 300°C and 370°C
Refractive Index at 25°C	1.597
Flash Point	Not below 290°F. No red label required
Color	Light amber ★
Iodine Number (average)	44
Acid Number	Less than 5
Saponification Number	Less than 5
Molecular Weight (average)	240
Appearance	Honey-like oil, very viscous
Odor	Phenolic
Corrosion (Copper Strip)	No darkening, but very slight solvent action on copper
Viscosity, absolute at 25°C	235 poises

★ Color of Nevillac 10° has been improved and is much lighter than offered over last few years.

NEVILLE

Nevillac 10° Resin, also known as PHO, is a most versatile material with respect to solubility and compatibility. This material is soluble in all commonly used solvents, except water and glycerol. It is soluble in ethylene glycol.

It is compatible with most synthetic resins including cellulose esters and ethers (nitrocellulose, ethylcellulose, cellulose acetate, etc.), vinyl acetate, vinyl butyral, zein, nylon, and partly compatible with vinyl acetate and chloride copolymer.

Due to the fact that Nevillac 10° is a hydrindylphenol derivative, it possesses many of the chemical characteristics and much of the solvent power of hydroxy-type solvents such as phenols, and aromatic hydrocarbon type solvents such as benzol or toluol. For this reason, it is capable of acting as a mutual solubilizing agent for resins, oils, cellulose derivatives, and the like, which are normally incompatible.

As Nevillac 10° is currently available without priorities, it will pay you to investigate this widely adaptable plasticizer. Request your gratis sample today.

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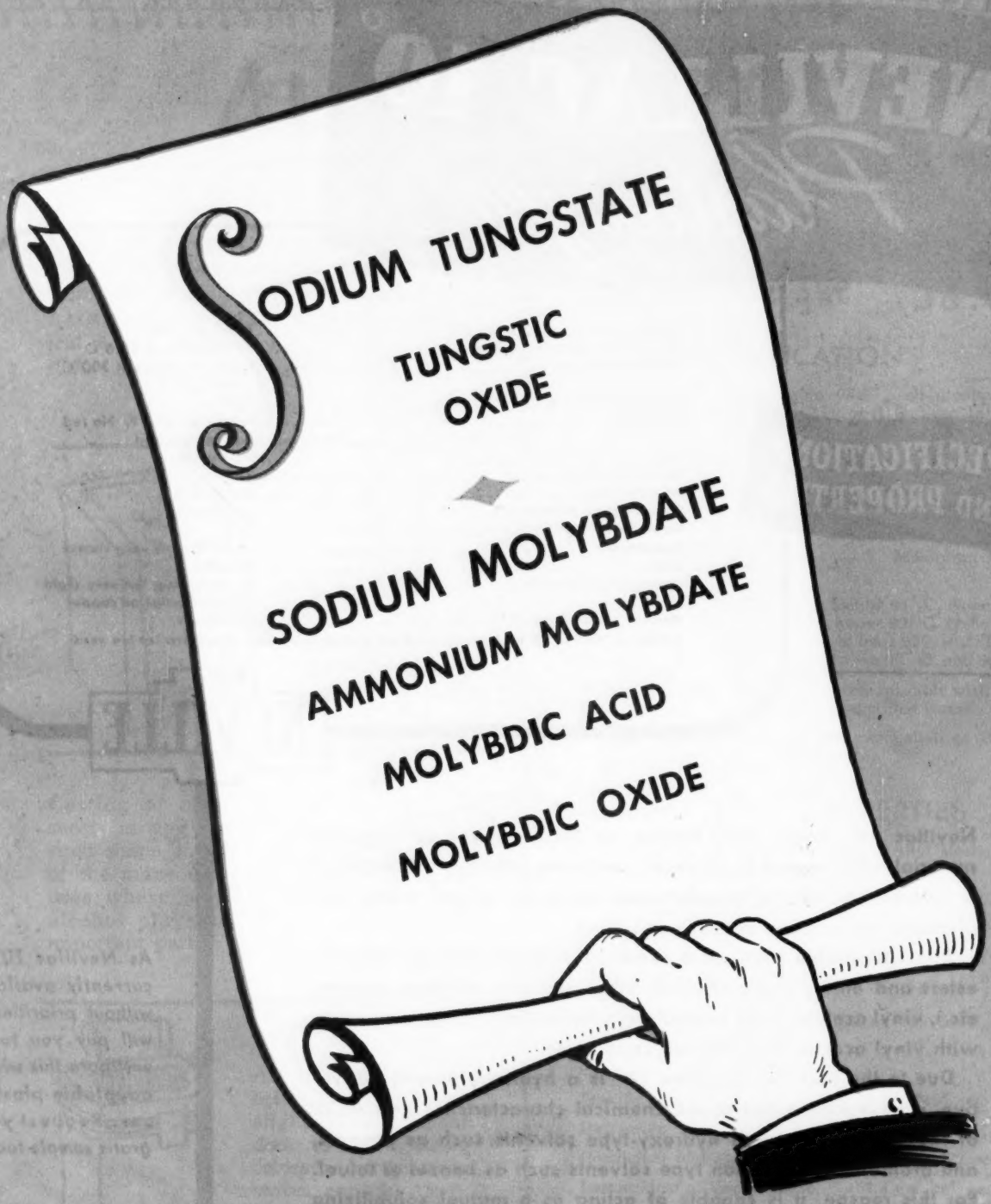
A-17



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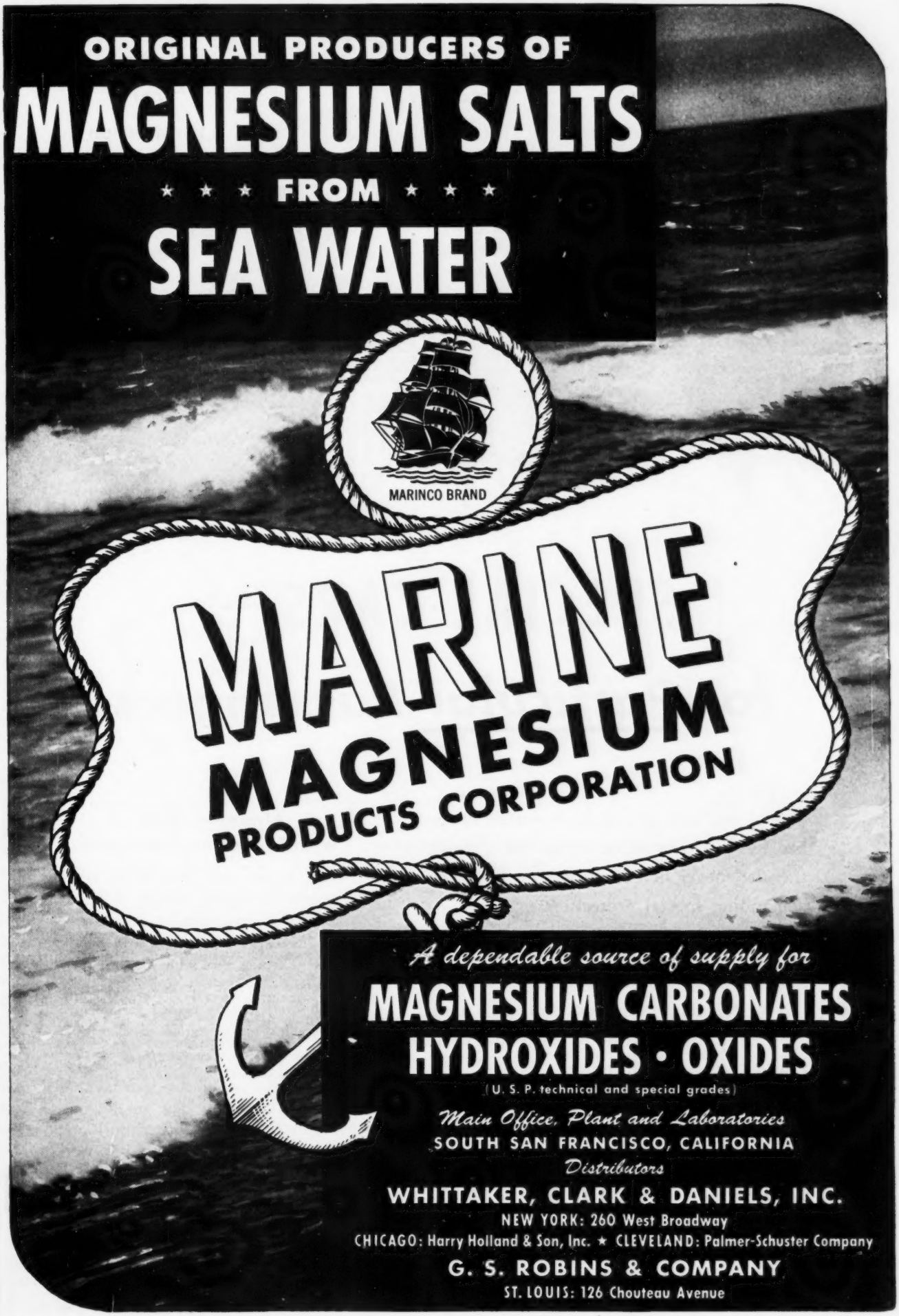
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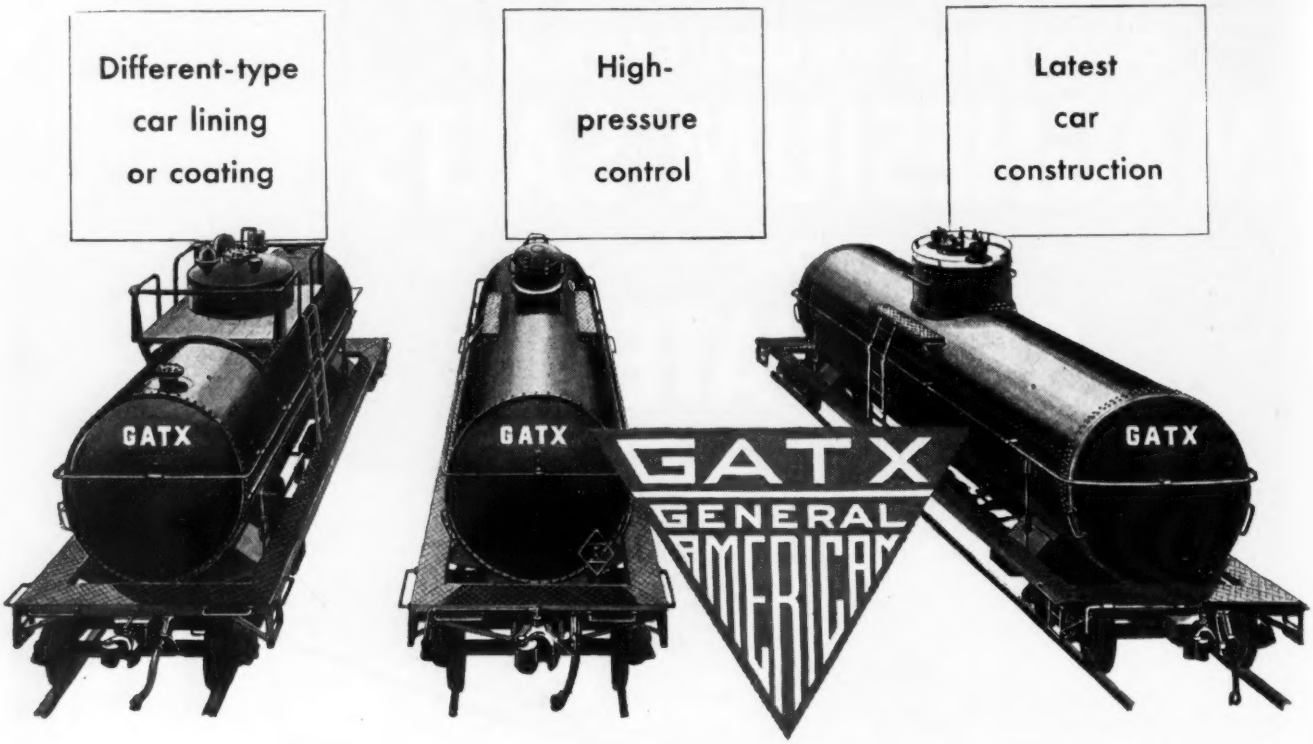

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A NOTABLE PRODUCTION ACHIEVEMENT

Copies of this up-to-date chart, containing the essentials of Penicillin therapy, are available on request.

THE record performance of Penicillin manufacturers in achieving large-scale production has resulted in the fulfillment of current military requirements for this remarkable antibacterial agent. Penicillin Sodium Merck now is available to the medical profession for the treatment of civilian patients, having been released by the War Production Board for general distribution through customary supply channels.

In this notable production achievement, Merck & Co., Inc. has been privileged to play a pioneering and progressively important rôle. Basic discoveries made by Merck microbiologists, and shared with other Penicillin producers, contributed vastly to the successful development of Penicillin manufacture. By applying chemical engineering technics to the manufacture of this difficultly produced antibiotic agent, Merck independently succeeded in devising and perfecting a practical method of large-scale production based on the mass-fermentation principle.

Penicillin Sodium Merck meets the recognized high standard of quality established for all products bearing the Merck label.

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Speed the Victory
with War Bonds

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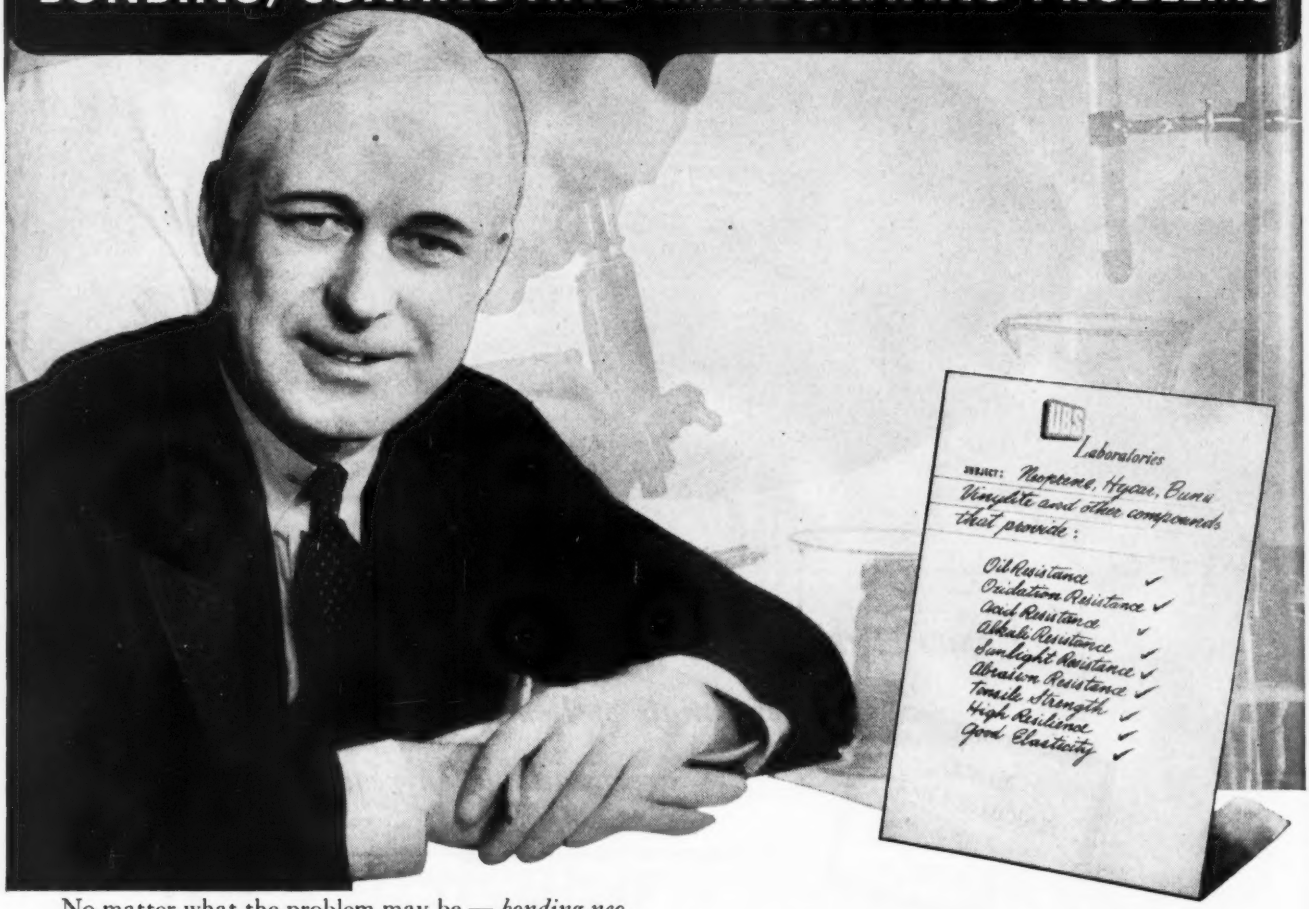
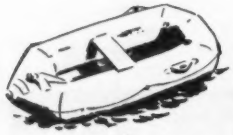
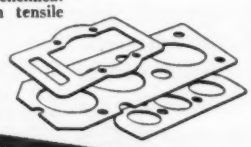
Consult THE UBS LABORATORIES ON POST-WAR BONDING, COATING AND IMPREGNATING PROBLEMS



No matter what the problem may be — *bonding neoprene, rubber and other coated or moulded parts to any ferrous or non-ferrous metal; corrosion proofing chemical tanks and equipment; laminating leather belting; coating magneto parts; combining or coating fabrics; impregnating paper; cementing various materials together; insulating wire and other articles; etc.* — you will find the UBS Laboratories equipped to provide (or develop) a formula that will fill your needs. Long-time specialists in the field of industrial Bonding, Coating and Impregnating Compounds, the UBS Laboratories not only know thoroughly the compounding advantages and limitations of all the latest synthetics, but even have developed an original synthetic latex and synthetic rubber of their own. *Write today, describing your Bonding, Coating, or Impregnating Problems.*



UBS developed adhesives are being used in the manufacture of inflatable Army and Navy Equipment, where weather and chemical resistant seams of high tensile strength are required.



UBS developed compounds are being successfully used to coat magneto parts and for cementing gaskets, where oil resistance is of great importance.

UBS developed adhesives and coating compounds are being widely used on Army delousing bags, protective clothing, etc., where acid resistance and flame resistance are of paramount importance.

UBS developed compounds are being used for chemical tank linings and to corrosion proof chemical handling equipment, where acid resistance and alkali resistance are primary factors.

Address all inquiries to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

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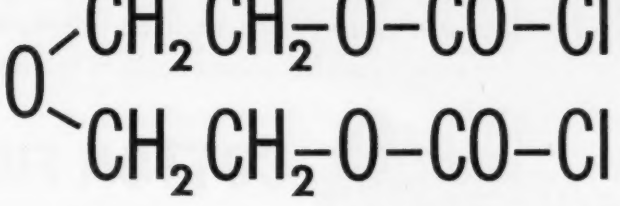
UNION BAY STATE *Chemical Company*

A *NEW* Product of Columbia Research

Diglycol Chloroformate

[Diethylene Glycol Bis(chloroformate)]



Here is a new chemical intermediate to fill the need for a non-volatile, relatively easily handled organic dibasic acid chloride.

Diglycol Chloroformate is reactive, for example, with alcohols or amines to form other organic intermediates and derivatives . . . suggesting important applications in the fields of Pharmaceuticals, Rubber, Paints, Resins and Plastics. At the right is a partial listing of the physical properties of Diglycol Chloroformate.

SAMPLES AVAILABLE FOR YOUR EXPERIMENTS

Samples of Diglycol Chloroformate will be furnished at no charge to responsible organizations and individuals who desire to test the applications of this new acid chloride in their processes. Write to the General Sales Offices at the address shown below.

PHYSICAL PROPERTIES

Diglycol Chloroformate [Diethylene Glycol Bis(chloroformate)] is a colorless, relatively non-volatile liquid of mild odor.

Molecular Weight, $C_6H_8O_5Cl_2$	231.0
Specific Gravity, 20°C./4°C.	1.389
Density, lbs./gal. at 20°C.	11.6
Refractive Index, $n_{20}D$	1.4542
Boiling Point, °C. at 5 mm. Hg. pressure	125-127
Melting Point, °C.	5.3-5.7
Vapor Pressure, 50°C.	<0.1 mm. Hg.
100°C.	0.8 mm. Hg.
150°C.	17.5 mm. Hg.
200°C.	194 mm. Hg. (with dec.)
Latent Heat of Vaporization, cal. per gram at 115-185°C.	82.6
Viscosity, Centipoises, at 20°C.	9.6
at 50°C.	3.5
at 100°C.	1.4
Flash Point, °C.	above 200
Surface Tension, 20°C. dynes/cm.	37.8
Solubility of water in compound, 25°C., % by weight, 0.2	

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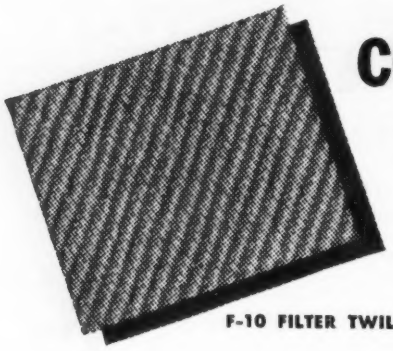

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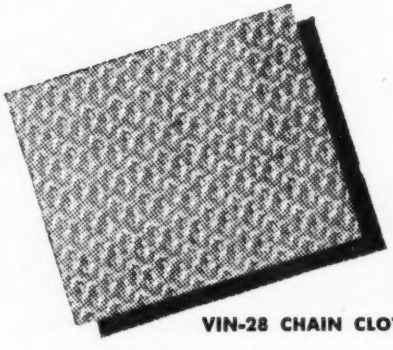

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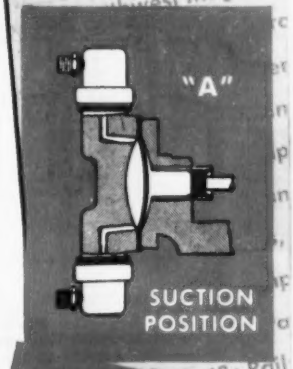
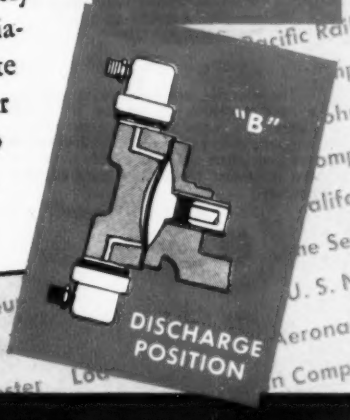
Kind and quantity are seldom a limiting factor, because WILSON *Pulsafeeders* handle chemicals of high or low viscosity, acids and volatiles, as well as slurries. In most instances, accuracy is guaranteed at better than ⅛ of 1%, and capacity may range from 1 cph. to 600 gph. or more. Flow may be mono or multiple.

Today, WILSON *Pulsafeeders* are serving magnificently in chemical laboratories, in food and other processing industries, and in water and sewage treatment all over the world. They operate on automatic settings, manual control, or a combination of both.

They are amazingly dependable. They have no leak-likely packing glands, and they have those patented, flexible diaphragms which operate against an inert liquid to obviate breakage. (See sketches) and then send for details of our cooperation in engineering WILSON *Pulsafeeders* to your requirements. We always welcome inquiries.

K-14





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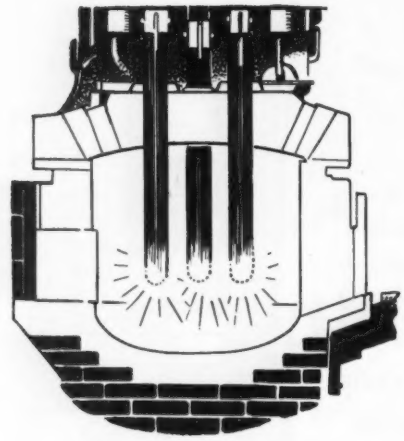
A BASIC FACTOR IN THE .. MIRACLE of ACETYLENE

Acetylene is extensively used for lighting in rural areas, lighthouses, harbor buoys and air beacons. In the oxy-acetylene process, for heating, cutting and welding of metals. In chemistry, for the manufacture of synthetic organic materials.



The electric arc furnace is capable of temperatures in excess of 6500° Fahrenheit, the highest man-made temperatures ever created. Here high calcium chemical lime and coke ore are combined to produce pure calcium carbide.

Chemical lime supplies the calcium in calcium carbide without which the modern miracle of acetylene would be unknown! High calcium quick lime and pulverized coke combined at high temperatures in the amazing electric arc furnace, produce pure calcium carbide which in contact with water liberates acetylene gas.

MARBLEHEAD

High Calcium

CHEMICAL LIME

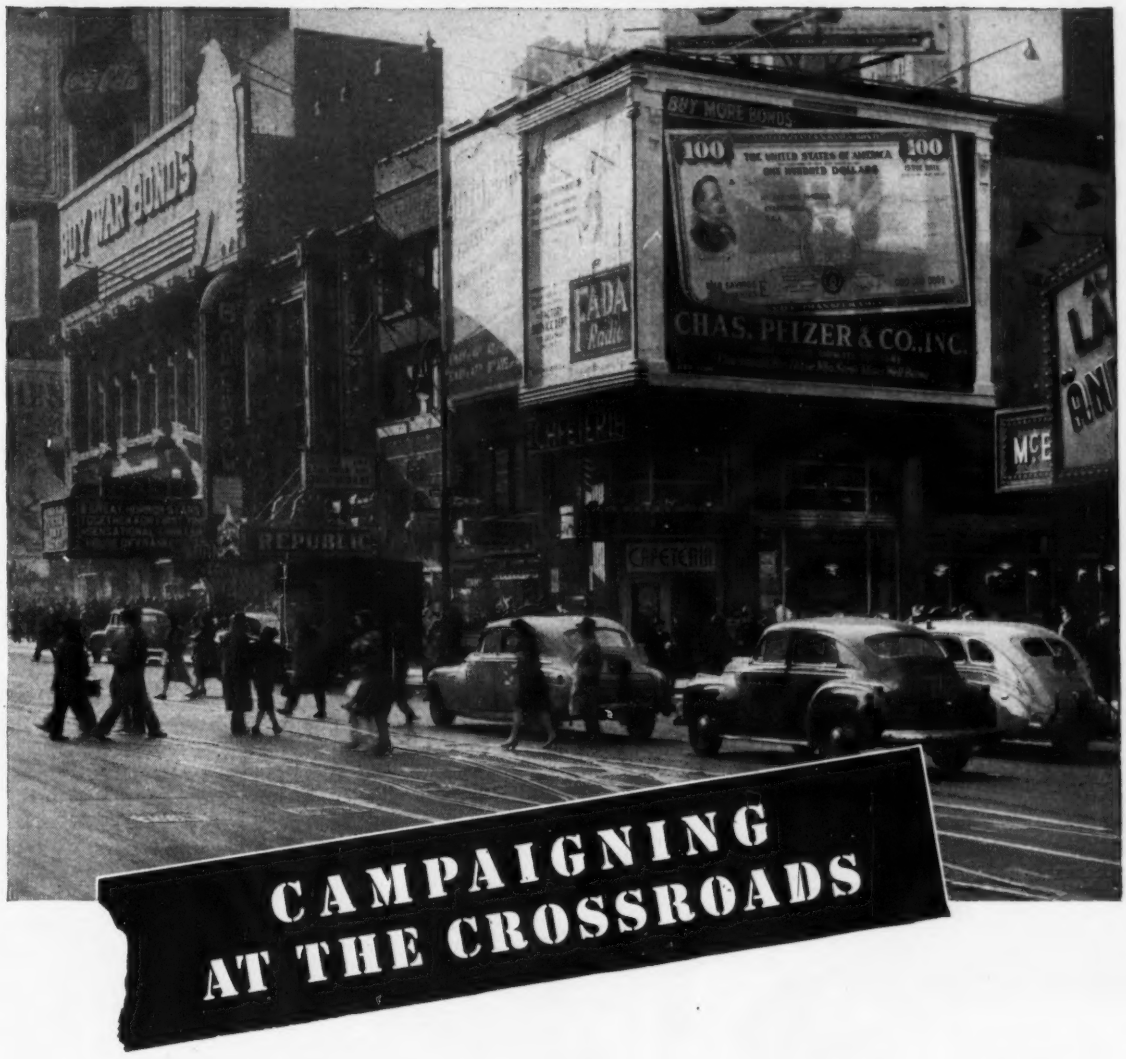
has been "standard" for many chemical processes with leading manufacturers over a period of 70 years. Its high calcium content, quick slaking properties, freedom from grit and impurities make Marblehead a source of chemical energy that can be relied on under the most exacting conditions.

For positive results whenever lime is used, specify Marblehead High Calcium Chemical Lime.

★ FOUR FORMS ★

MARBLEHEAD LIME CO.

160 N. LaSalle St. Chicago 1, Ill.



CAMPAIGNING AT THE CROSSROADS

At the "Crossroads of the World", above the throng and bustle of New York's Times Square, you'll see this outdoor sign with its war bond two stories high. Here is part of a sustained campaign to back up the men who are fighting for us in the earth's far places. It is a campaign in which Chas. Pfizer & Co. is proud to help.

At other crossroads thousands of miles west of Manhattan, sure-footed litter-bearers pass warily along narrow jungle trails. On other fronts far to the east, mud-bogged lanes lead from battalion aid station to clearing station and field hospital. In places like these, Penicillin is aiding the medical personnel of our armed forces in their service to the wounded in land, sea and air combat.

As the world's leading manufacturer of penicillin, Chas. Pfizer & Co. welcomes this opportunity to be of help. This is campaigning, too. This is backing our men with drugs as well as dollars.

Producing penicillin is a solemn responsibility as well as a deeply-felt privilege. For this almost unbelievable drug is often most effective at the most important crossroad of all — the crisis where man's very life hangs in the balance.

THE WORLD'S LARGEST PFIZER QUALITY PRODUCER OF PENICILLIN

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CHEMICALS FOR THOSE WHO SERVE MAN'S WELL-BEING

Stops Rust As Easy As Opening A Valve?

You'll say so when you see the protection against corrosion afforded by the feeding of Rusticon into the water system in your plant. No fuss, no mess.

Rusticon Liquid Silicate Process of Water Corrosion Control operates independently of water analysis. Hence, industrial plants solve corrosion problems with the easy-to-feed Rusticon Silicates. Automatic feeders deliver a definite quantity of silicate for protection, based on the flow of water or the action of the pumps.

Ease, yes, and efficiency and economy as well. Consider these advantages:

1. Protection of water mains
2. Protection of service pipes
3. Protection of heaters and equipment
4. Elimination of "red water", consequently of staining and contamination of products
5. Lower pumping costs

How Rusticon Prevents Corrosion: Feeding 8 parts of colloidal silica per million forms a thin protective film on metal walls. This quantity is furnished by 20 gallons of Rusticon LN per million gallons of water.

Let's talk over your water corrosion problem. For more complete information and typical installation details for the Rusticon Silicate Process, write us.

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GLASS PIPE *can't keep a Secret . . . .*

PYREX Pipe provides a continuous "sight glass" for observing your product at every production stage. It's a matter of record that in many cases, transparent PYREX Pipe has made it possible to detect product contamination in time to prevent costly loss of an entire run.

But that is only one reason why PYREX brand Glass Pipe has earned a place in industrial plants. Its long years of service under tough operating conditions, its ruggedness and ability to take abuse have proved PYREX Pipe a thoroughly practical plant material.

Where product purity must be maintained, transparent PYREX Pipe offers the double protection of corrosion resistance and ease of cleaning.

The remarkable resistance of PYREX Pipe to corrosion protects your product from contamination and contributes to its long service life. Resistance to thermal shock permits thorough, efficient cleaning with hot water and steam.

IT'S EASY TO INSTALL PYREX PIPE

Installation of PYREX Pipe is just as easy as maintenance of cleanliness. No special tools, no special training are required. Corning provides all the fittings you need; piping comes to you in the correct lengths ready for assembly with no additional work required.

For complete information on how PYREX Pipe can solve your food handling and conveying problems, write Industrial Sales Dept., CI4

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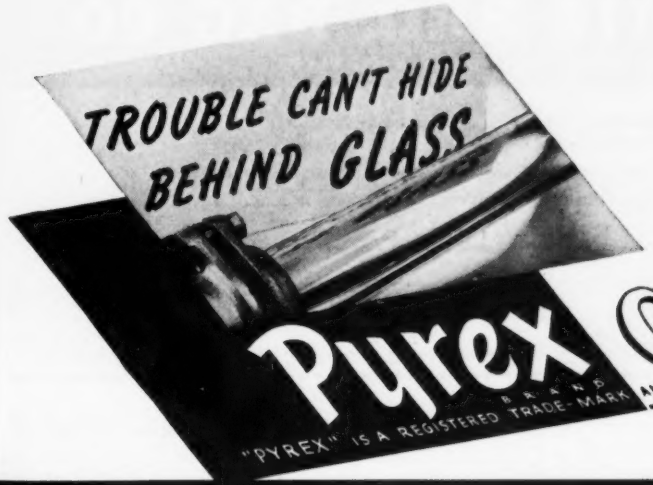
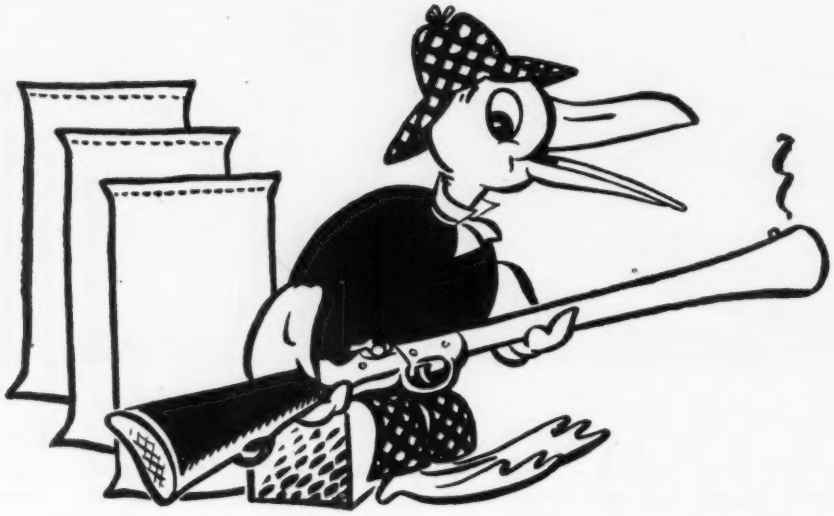
CORNING, NEW YORK



GLASS PIPE AND INDICATES MANUFACTURE BY CORNING GLASS WORKS, CORNING, NEW YORK

ON CONSTANT GUARD

Against the enemies ...of your products



Will absorbed moisture—or evaporation—damage your packaged products? Is there possibility of your products absorbing foreign odors while in storage or in transit? Or of losing their natural, desirable aroma? Is sifting a problem? Or vermin? Or contamination?

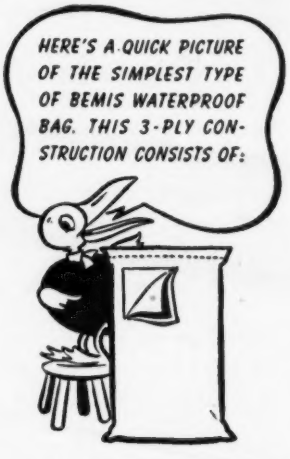
If the answer is "yes" to any of these questions, and if your products are in powdered, granular, crystal or lump form, then Bemis Waterproof Bags are just what the doctor ordered. They give full protection against all these enemies of your products.

How will you know what particular type of bag your products require?

That's one of the tasks of the Bemis Shipping Research Laboratory. With specially designed equipment, chemists and research specialists determine what bag materials and constructions should go into each job.

Almost as important as top protection for your products are the major money savings you enjoy. Bemis Waterproof Bags cost less than other containers giving comparable protection. Further, they save storage space on both empty and filled bags—they speed up filling, closing and handling time—they save on shipping costs—and frequently reduce damage claims.

Send the coupon today for the interesting booklet—"A Guide to More Efficient Shipping." Then, if you wish, one of our representatives will call on you to discuss your packaging requirements. No obligation, of course.



1. An inside layer of flexible creped kraft paper impregnated with...
2. a layer of waterproof adhesive that also seals the interstices in the...
3. outside layer of tough, closely woven fabric and cements both layers together.

The outer fabric may be either cotton or burlap. The kind of bonding adhesive depends upon the commodity to be packed. One or more linings of paper and adhesive may be incorporated depending upon the protection needed. Bag seams may be cemented or sewn.

THEY'RE TAILOR-MADE TO YOUR JOB

WATERPROOF DEPARTMENT

BEMIS BRO. BAG CO.

ST. LOUIS . BROOKLYN

BEMIS BRO. BAG CO., 408-J Pine St., St. Louis 2, Mo.; 5122 Second Ave., Brooklyn, N. Y.

Please send your special booklet, "A Guide to More Efficient Shipping," and details about use of Bemis Waterproof Bags for_____ (PRODUCT)

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ARE you confronted with shortages of rosin, phenolics, shellac, glycerols? Vinsol Resin provides a dark-colored, high-melting extender, modifier, or even replacement, for these and many other war-needed plastic materials. It is remarkably low in cost, and readily available in large quantity.

Despite its low delivered cost—2½ to 3½ cents per pound—Vinsol Resin may replace up to 35% of phenolic resin without markedly impairing physical properties. Insoluble in petroleum derivatives, it promotes outstanding oil and grease resistance. It brings excellent electrical characteristics, low water absorption, hardness and low cost.

You can best determine the material-and-money-saving features of Hercules Vinsol Resin by testing it yourself. Coupon brings a generous free sample and detailed properties.

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Please send sample of Vinsol Resin and further details.
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For product distribution in the Midwest . . .

Since 1923, G. S. Robins & Company has supplied industry in the mid-west with chemicals. This, plus our long experience offering technical assistance whenever possible, has kept us constantly apprised of the needs of ALL industries. Keeping in constant touch with them, helping to solve their chemical problems, has afforded us many opportunities to recommend a diversity of products. If your company is looking for representation in the mid-west, we invite you to consider our past experience and reputation. We *know* you'll find G. S. Robins & Company reliable distributors for your products.

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A Great New Stride in
Spectrophotometric Equipment

THE NEW BECKMAN IR-2 Infrared Spectrophotometer

INCORPORATES FAR-REACHING ADVANCEMENTS IN ACCURACY, ADAPTABILITY AND SIMPLIFIED OPERATION

JUST as the original Beckman Infrared Spectrophotometer made possible the first practical and widespread application of infrared methods for industrial process control, this new Beckman advancement marks another great step forward in spectrophotometric design and performance.

The Model IR-2 embodies many new and useful features resulting from the years of experience gained by the Beckman organization in producing more infrared spectrophotometers *than all other manufacturers combined.* While the earlier instruments were designed specifically for routine analysis of hydrocarbons, the new Model IR-2 emphasizes maximum adaptability to a wide range of general applications. It is equally suitable for routine analysis or research investigations—on gases, liquids or solids—and it provides many novel features not heretofore available in even the most expensive research instruments.

Under war emergency conditions only plants of urgent importance to the war effort have been able to purchase Beckman Infrared Spectrophotometers. But increased production is now making these instruments available for general laboratory and industrial use . . . and simultaneously Beckman is making available this new years-ahead instrument. If you are planning the purchase of spectrophotometric equipment, *it will pay you to investigate the new IR-2.*

Outlined at the right are a few of the important features of this advanced instrument. Write for more detailed information.

BECKMAN INSTRUMENTS
NATIONAL TECHNICAL LABORATORIES • SOUTH PASADENA 17, CAL.

BECKMAN **INSTRUMENTS CONTROL MODERN INDUSTRIES**

IMPORTANT FEATURES OF THE BECKMAN IR-2 SPECTROPHOTOMETER

• ***Unusual Versatility*** **is provided by interchangeable elements. Various types of light sources, cell holders, etc. can be interchanged to adapt the instrument to a wide range of applications on liquids, solids and gases. Even cells with path-length of a meter or more can be used.**

• ***Increased Accuracy and Stability*** **are obtained through use of a new energy measuring system employing a bolometer and vacuum tube amplifier. This system eliminates temperature drift, non-linearity errors and vibration difficulties that are characteristic of conventional thermopile-galvanometer systems.**

• ***Constant Temperature*** **insures accuracy at *all* wavelengths. The monochromator and cell compartments are thermostated, eliminating the uncertainty of inadequate "temperature compensation" and making a constant-temperature room unnecessary.**

• ***Quick Easy Readings*** **can be made directly in percent transmission and optical density, and provisions are made for direct-connecting a standard potentiometer-type recorder. The wavelength range is 1 to 15 microns and wavelengths can be selected either by a continuous wavelength drive calibrated directly in microns or by a 17-position stop-mechanism that greatly simplifies routine analysis operations. Accessory equipment includes a motor drive for continuous wavelength scanning.**

• ***Constant Radiation*** **at all times is another important advancement. The source of radiation is a photo electronically stabilized Nernst lamp which insures constant radiation regardless of line voltage fluctuations.**

• ***Hermetically Sealed,*** **the optical path is free of CO_2 and water vapor. Two-stage drying protects precision optical elements.**

These are only a few of the improvements incorporated in this new Beckman development but they are typical of many unusual features to be found in the IR-2 that make this the most advanced Spectrophotometer available.

Put yourself in his shoes

Suppose there were no money to bring your child into the world? In a tearful, dejected letter, Pvt. R.'s wife told him she was going to have a baby. There wasn't enough money to pay for medical care and hospitalization. Helpless, Pvt. R. appealed to the Red Cross. In a few days he received word that they had assisted his wife in applying for emergency maternity and infant care.

Suppose you were wounded, disabled, jobless and discouraged? A Marine Private, he was wounded in the South Pacific and discharged for disability. He went home—jobless and afraid! Unable to take up his former trade, in desperation he appealed to the Red Cross. They put him in touch with the proper agency—he's doing swell, now.

Suppose your mother were ill and without funds? Seaman T. M. received word his mother was desperately ill and without money. He remembered advice he'd heard and went to his Red Cross Field Director who requested the boy's local chapter to arrange for care. They did. Now, anxiety lifted, Seaman T. M. is a better fighting man. Another example of your Red Cross in action.

Suppose your son were a prisoner? Imagine the anxiety of the parents of Pvt. E. D., who had had no word from him in months. The Red Cross sent a welfare inquiry. And then the International Red Cross reported that he was healthy and well, and was receiving American Red Cross packages regularly. Your money gets those packages to *him.*

Suppose you were dying for want of blood plasma? The shrapnel and fragments from a shell burst riddled Sgt. R. J. M.'s left arm. He was losing blood fast. A medical corpsman administered first aid and Red Cross blood plasma. Then they carried him to the field station and gave him 8 more pints of plasma. Without it, he would have died.

Suppose you'd lost your leg? And you couldn't bring yourself to tell your family? It happened to Sgt. J. T. and now his parents were coming to see him in the hospital. He appealed to a Red Cross worker to break the news. It was a tough job, but she did...and soon Mom was holding his hand while Dad was telling funny stories—and Sgt. J. T. was smiling happily.

The Red Cross can't do this work without your help!
The actual cases outlined above illustrate just a few of the thousands of ways in which the Red Cross helps our fighting men—at home and overseas. But without *your* help there would be no Red Cross to do this humanitarian work. For the Red Cross is wholly dependent on the money that you and other sympathetic Americans contribute. And after three years of war, the work of your Red Cross is greater than ever. Think of the suffering you can alleviate by your contribution—*and give all you can!*

KEEP YOUR
RED CROSS
AT HIS SIDE

GIVE *NOW*— GIVE *MORE*

CHEMICAL INDUSTRIES

★ *Prepared by the War Advertising Council in cooperation with the Office of War Information and the American Red Cross* ★

WORLD'S LARGEST PRODUCER OF SYNTHETIC RESINS

RCI

outstanding reasons WHY

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RCI CHROME YELLOWS

No. 1010—C.P. Chrome Yellow Primrose
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assure outstanding results

Upholding in every respect the RCI reputation for exceptional quality, these three chrome yellows assure fine end products. Low cost and speeding of production are other advantages the formulator will appreciate. Write direct to the Sales Department at 105 Bedford Ave., Brooklyn 11, N. Y., for a complete list of RCI chemical colors.

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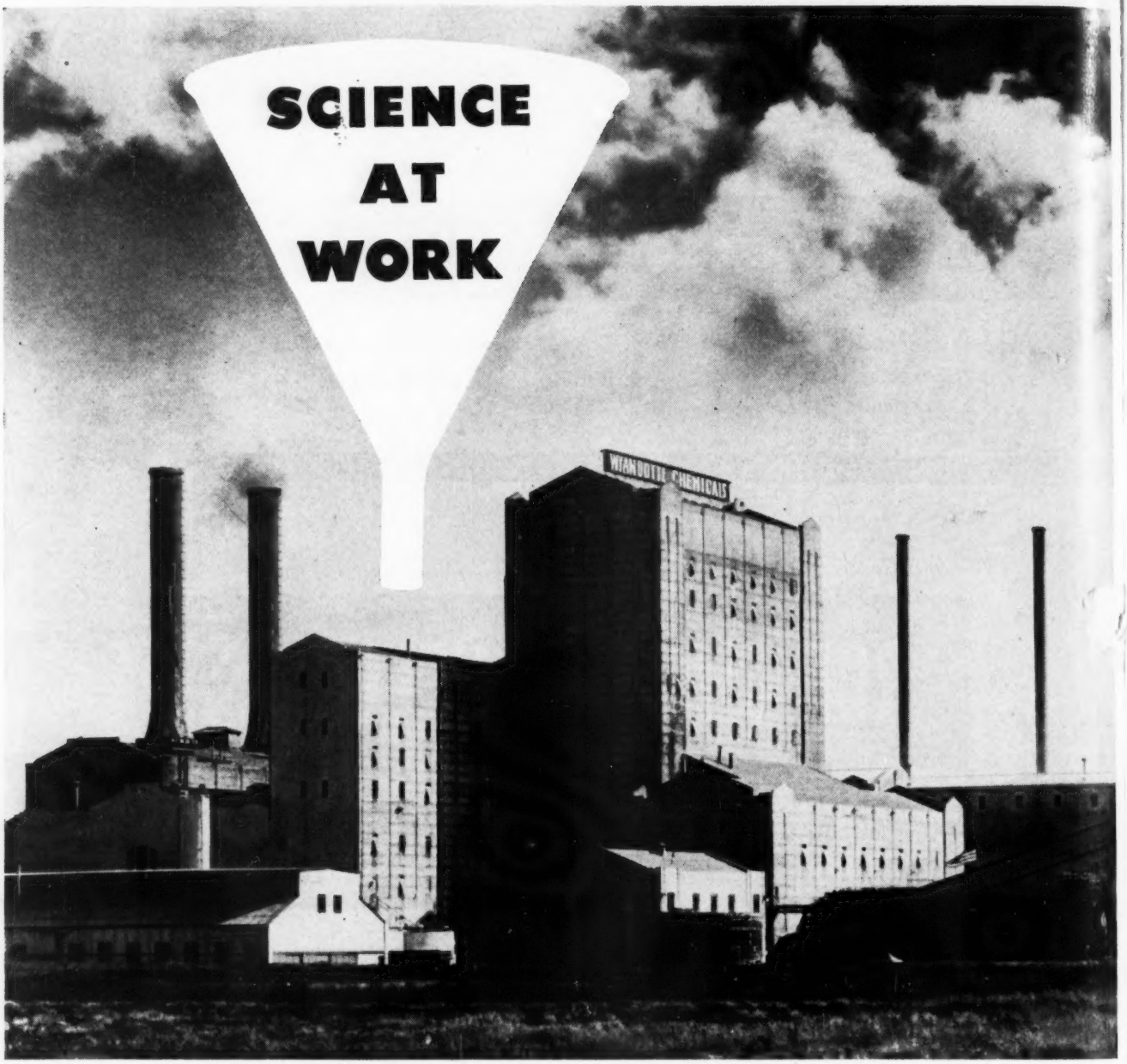
CHEMICAL COLORS • SYNTHETIC RESINS • INDUSTRIAL PLASTICS • INDUSTRIAL CHEMICALS



Part of North Plant, Wyandotte Chemicals Corporation, Wyandotte, Michigan, equal in height to an 18-story building. Here are produced three of the Wyandotte chemicals that meet the exacting requirements of American industry.

WYANDOTTE CHEMICALS CORPORATION

ONE OF THE WORLD'S GREAT PRODUCERS OF CHEMICALS

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CAUSTIC SODA
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CHLORINE
HYDROGEN
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AROMATIC INTERMEDIATES
DRY ICE
OTHER ORGANIC AND INORGANIC CHEMICALS

WYANDOTTE CHEMICALS CORPORATION
MICHIGAN ALKALI DIVISION • WYANDOTTE, MICHIGAN

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VITAL TO VICTORY TODAY—READY TO WORK FOR A GREATER TOMORROW

These People are seeing answers to your problem

The RCA Electron Microscope may tell you why a process you banked on fails, and what procedure will bring success . . .

THE upper picture, at the right, shows an RCA Type EMU Universal Model Electron Microscope. Shown in the lower picture is a Type EMC Console Model RCA Electron Microscope. With the large "Universal" model, it is possible to observe objects directly at magnifications as high as 20,000 diameters. With the smaller "Console" model, objects studied are magnified to 5,000 diameters. With either instrument, sharp, clear micrographs can be obtained easily and quickly.

Images shown and photographed with both instruments are characterized by extremely high resolving power and remarkable depth of focus. For this reason, either instrument can be employed, if desired, to obtain stereoscopic pictures showing objects in strikingly effective and informative 3-dimensional perspective.

The "Console" instrument is, of course, less expensive than the "Universal" model. RCA Electron Microscopes are now used by an impressive number and variety of industrial companies and institutions of the highest standing. RCA engineers welcome inquiries from responsible industrial, scientific and educational sources. Please address Electron Microscope Section, Dept. 117R, RCA, Camden, New Jersey.

BUY MORE WAR BONDS

RCA

RADIO CORPORATION OF AMERICA

RCA VICTOR DIVISION · CAMDEN, N. J.

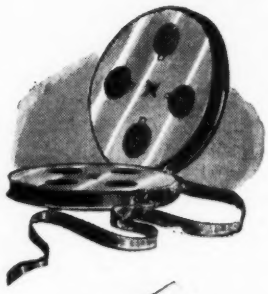
In Canada, RCA VICTOR COMPANY LIMITED, Montreal

TO COMPANY PRESIDENTS:

Here's Another BIG CHANCE FOR YOU to "Pass the Ammunition!"

Today—thanks largely to you and other industrial executives—22,000,000 civilian workers are speeding victory and achieving postwar security through the Payroll Savings Plan. Over 60% of the 6th War Loan subscriptions came from this source—and, between drives, this forward-looking plan has been responsible for 3 out of 4 War Bond sales!

Good as this record is, the Payroll Savings Plan can be still more effective. Believing this can best be accomplished by giving Bond buyers a definite idea of the many benefits accruing to them, the War Finance Division has prepared a variety of active aids for employee education.

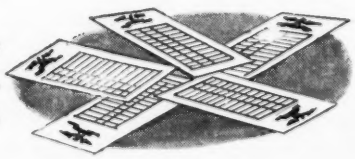


This new "ammunition" includes:

a—An entertaining, swift-paced moving picture, graphically showing the importance of buying—and holding—War Bonds.

b—An interesting, easy-to-read booklet, explaining how War Bonds may be accumulated to provide education for children, homes, retirement incomes, etc.

c—Attractive, handy War Bond envelopes, enabling Bond holders to note each separate purchase—and the specific purpose for which each Bond or group of Bonds was bought.

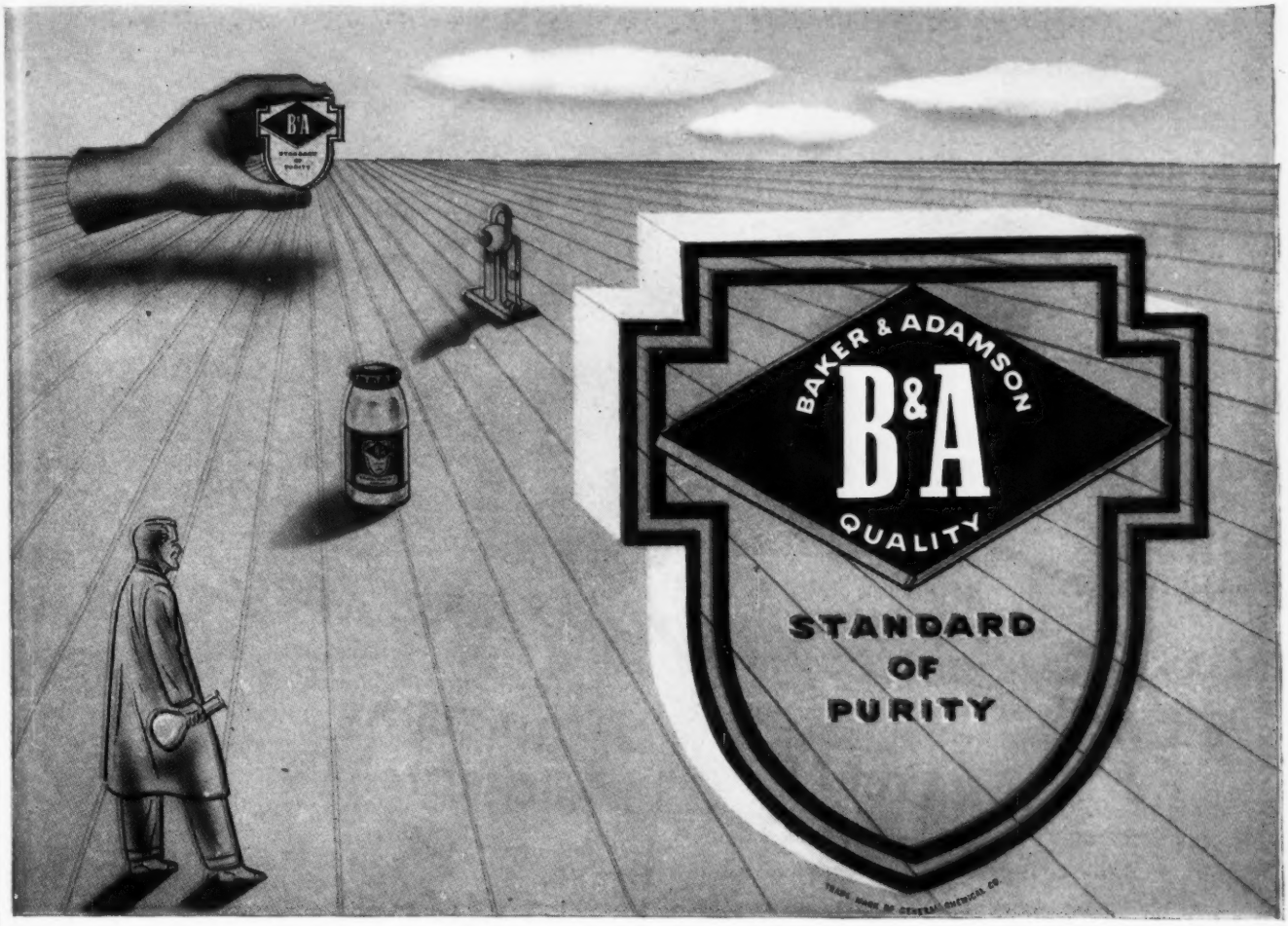


Passing this particular ammunition requires that you reappraise your own company's Payroll Savings Plan. Have your own War Bond Chairman contact the local War Finance Committee—today! They will welcome the chance to discuss this new program with you.

The Treasury Department acknowledges with appreciation the publication of this message by

CHEMICAL INDUSTRIES

★ *This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★



WHAT MAKES THIS TRADE-MARK stand out?

IN EVERY INDUSTRY certain trade-marks stand out . . . become accepted standards of quality.

IN THE FIELD OF REAGENT CHEMICALS, the B&A shield has become a recognized symbol for *quality*, *purity* and *reliability* among men who know and use reagent and fine chemicals.

TWO OUTSTANDING FACTORS CONTRIBUTE to this wide-spread acceptance. First, Baker & Adamson always maintains strict manufacturing standards for every product, and its extensive line embraces more than 1,000 quality chemicals! Second, B&A's advanced production techniques and modern control methods are coupled with the "know how" born of 63 years' experience . . . a combination that puts added value into every lot of chemicals!

AS A RESULT, chemists count on B&A . . . rely on the B&A "Standard of Purity." That's why *when quality is a must*—in reagents, fine or "special" chemicals—*specify B&A*. . . . B&A, you will find, is the quality source that counts most!

Setting the Pace in Chemical Purity Since 1882

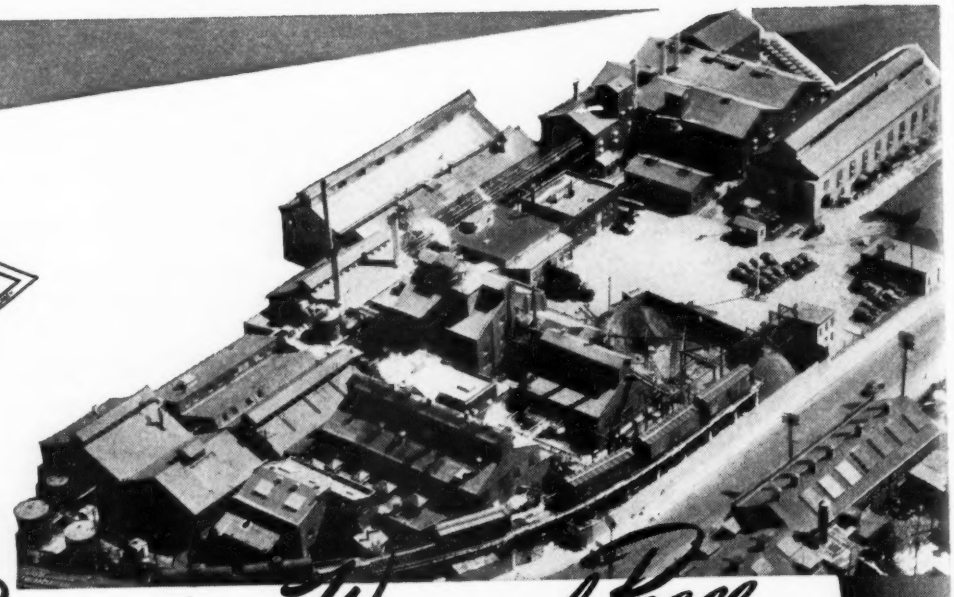
BAKER & ADAMSON *Reagent and Fine Chemicals*

Division of GENERAL CHEMICAL COMPANY, 40 Rector St., New York 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Boston • Bridgeport (Conn.) • Buffalo Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City • Los Angeles Minneapolis • New York • Philadelphia • Pittsburgh • Providence (R. I.) • San Francisco • Seattle St. Louis • Utica (N. Y.) • Wenatchee • Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver



Essentials in War and Peace

NATURAL BICHROMATE OF SODA

Crystals . . . Granular

NATURAL BICHROMATE OF POTASH

Crystals . . . Granular

Constant effort and engineering skill for nearly forty years have brought the quality of NATURAL BICHROMATES to its pre-eminently high level of today. In spite of present operating difficulties, the maintenance of that recognized standard of quality has been and will be maintained. In war or peace you can depend on "Natural."

NATURAL PRODUCTS REFINING COMPANY

910 GARFIELD AVE. JERSEY CITY, N. J.

"BUY CROW-MATES"

Editorial

An Unsound Proposal

by ROBERT L. TAYLOR, editor

THE PATENT SYSTEM REFORMERS have their noses in the air again, for fresh game has crossed the trail.

It may or may not have been the Supreme Court's ruling in the Hartford Empire case that caused Representative Voorhis of California to reintroduce his patent reform bill in the present Congress after it had met slow death in the last, but the Hartford case has doubtless lent point and strength to the bill in the eyes of many.

In the case of Hartford Empire Co. vs. the U. S. Government, it will be recalled the Supreme Court found that while the company was guilty of violation of the anti-trust laws in its use of patents, the court was not empowered under existing law to seize the patents or force the company to license them. The Voorhis bill—which incidentally has been introduced as an amendment to the Clayton Anti-Trust Act rather than as direct patent legislation, and hence has been referred to the House Judiciary Committee for hearings rather than to the less sympathetic Patents Committee—provides that if a patent "unreasonably limits" the supply of any article of commerce it is illegal and hence unenforceable. The Bill also provides that all patent agreements be registered with the Attorney General, that any patent agreement involving an arrangement on price is illegal, and that the Attorney General may intervene in any private patent litigation involving the public interest.

WE DO NOT QUESTION THE SINCERITY of the Voorhis Bill. But like many sincere proposals that have been placed before our lawmakers in recent years, it demonstrates a serious lack of understanding of the functioning of the system it supposedly is designed to protect.

For example, it includes the stipulation that nonuse of a patent or failure to grant licenses which (in the opinion of the Attorney General) "has the effect of unreasonably limiting the supply of any article in commerce" is cause for nullification of the patent. This in effect proposes compulsory licensing on a limited scale, the limit to be determined by a man in a politically appointed office in the Federal government. It is but a step from there to compulsory licensing of patents in general.

Compulsory licensing has been proposed in many bills that have come before Congress over the years. It has been the subject of many congressional committee hearings and in every case it has been rejected as contrary to the public interest. The reason is simple to those who are familiar with patent system fundamentals. A patent is a monopoly. When it is stripped of its monopoly rights through compulsory licensing or any other means, it ceases to have value, and the whole system of patent protection collapses. Expenditure of time and money on research are discouraged, and what fruits of research there may be are driven underground.

THE OTHER PRINCIPAL PROPOSAL in the Voorhis Bill, namely that the Attorney General be permitted to intervene in any patent litigation which in his opinion "involves the public interest," again substitutes government by men for government by law. Under such an arrangement, the Justice Department would be able to throw its active support to one side or the other in virtually any patent case that comes before the courts. Under present law, the Government cannot interfere unless it can charge actual violation of a statute, such as the Sherman Anti-Trust Act, in which case it must bring suit through the regular channels of the civil or criminal court.

In an attempt to prevent the misuse of patents, Representative Voorhis has introduced a measure which, in the words of the House's own Patents Committee chairman, Representative Frank W. Boykin of Alabama, "is not only alien to the American system of jurisprudence but also, if adopted, would introduce complexities and uncertainties in the administration of the patent laws and would do much to defeat the end they were designed to attain." If the Voorhis Bill is enacted into law, it could deal a staggering blow to scientific and industrial progress in this country.

Why Not Teach Direction of Research?

IT SHOULD BE SELF-EVIDENT that profitable research is the consequence of intelligent and discerning research direction. The ability to make accurate and thorough measurements and observations is one thing; the ability to plot the likeliest course to the desired goal—to see the panorama rather than the individual details of the topography—is quite another.

The very obvious fact that a great many chemical concerns are blessed with the services of capable directors is largely a matter of luck. These men, grad-

uates of universities and colleges, are well-trained technical men who by their own efforts have grasped the fundamentals of competitive business, who have learned the pitfalls of laws—both the natural ones of economics and the man-made ones of patents and the like—and who have wrestled with the problems of production.

Isn't it time some of the things that make for better direction of research effort were taught? Granted that many of the desirable qualities are inherent rather than acquired, still a well-integrated course of study, which included the fundamentals of business, patent law, engineering, and possibly some other fields, as they apply to fruitful research endeavor, might make it easier for the right type of man to exercise his talents more wisely.

Lawyers are taught to be lawyers, engineers to be engineers, chemists to be chemists. Perhaps it is not too much to expect that if this strictly vertical type of education were modified—which indeed has already been done in some schools, particularly in engineering curricula—it might give us men of broader perception and more prudent judgment.

Poor Technical Manpower Cooperation

SELECTIVE SERVICE HAS BEEN CRITICIZED by technical men for not attempting to insure better than it has the continued availability of an adequate supply of chemists, physicists, engineers and similar types of highly trained scientific manpower. However, it appears that technical people have not done too well themselves in responding to the periodic requests of the National Roster of Scientific and Specialized Personnel for data to supplement the original questionnaire. Those failing to reply have amounted to 35 per cent of the total registrants in some classes.

Some of the registrants are out of circulation because they are in uniform, but there must be a large group, who have done their profession, their country, and themselves a disservice by such action. Some offer the excuse that the National Roster has made so many mistakes that it is of no value. Whether this is true or not is beside the point, for the attempt to provide a complete cataloging of the nation's scientific talent must be supported to the full before any criticism of this nature becomes valid.

Back the Census

THE LAST CENSUS OF MANUFACTURES was taken in 1939. After that the war interfered with this valuable government activity and it has not yet been resumed.

We understand that the Bureau of Census now has plans for a new Census of Manufactures and a Census of Business as of 1945 if it can get the necessary appropriation from Congress. That there should be any opposition to the relatively small expenditure required for these two valuable services just isn't understandable to anyone who works at market research. But a recent report from Washington says that there is. Chemical marketers can help get the appropriation through and get the census data back at the earliest possible time by writing the Bureau of the Census and letting the people there know that the chemical industry wants and needs the Census of Manufactures and is concerned about possible failure to provide the appropriation. A stack of such letters can be a powerful expediter if one is necessary.

There's More Than Salary

WE HAVE NO STATISTICS, but general observation leads us to believe that the frequency of job changes among management and technical personnel in the chemical industry is higher than it has been in many years, if not at an all-time peak. As in other fields in which the tendency has been even more prevalent. the reasons for individual changes probably vary over a considerable range. We'll wager, however, that the matter of salary increases is one of the most frequent.

In this respect, one of our good contemporaries, the *Detroit Chemist,* recently published a little article by William B. Katz that holds much of importance to those contemplating a change of employers as well as those who are charged with the responsibility of keeping a staff intact in the face of limited raise allowances and attractive salary offers from the outside.

Mr. Katz points out quite rightly that salary is by no means always a true measure of the economic status offered by a job. Economic status includes many factors other than salary, all of them important. It includes such strictly financial considerations as stability of employment and salary, overtime, bonuses, vacations, sick leave, insurance, retirement plans; employment conditions such as location, company future, your own future, employer attitude, employee attitude, opportunity to learn, freedom of action; and working conditions such as safety, health, and adequate tools and equipment to do the job expected.

Especially today, when many salaries are higher than they probably will be after the war, it is a mistake to forget or minimize these other factors that frequently made a lower salaried job more attractive than a higher paying one.

New Cover

WITH THIS MONTH'S ISSUE, we depart from our long standing custom of carrying advertising on the front cover of CHEMICAL INDUSTRIES. In addition to providing an attractive editorial cover, we believe this step will bring the external appearance of the magazine up to the level of the inside make-up which last year won an award of merit in a national competition among business papers for greatest improvement in appearance.

We take this opportunity to thank Commercial Solvents, Dow, and Monsanto who, in order to make this move possible, so graciously consented to relinquish their front-cover advertising positions for other space elsewhere in the magazine.

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Boiling range, 5-95%	100-103° C.
Specific gravity at 25–25° C.	0.768
Pounds per gallon at 25° C.	6.4
Freezing point	<−120° C.
Refractive index at 25° C.	1.421
Flash point	−5° C.
Fire point	−5° C.
Viscosity at 25° C., centipoises	0.72
Viscosity at 60° C., centipoises	0.47

SOLUBILITY, GRAMS PER 100 GRAMS SOLVENT:

Acetone at 25° C.	∞
Alcohol at 25° C.	∞
Benzene at 25° C.	∞
Carbon Tetrachloride at 25° C.	∞
Ether at 25° C.	∞
Methanol at 25° C.	53
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Water at 80° C.	v. sl. soluble

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- Grinding Assistants
- Leather Dressings
- Mercerizing Assistants
- Metal Cleaners
- Paper Coatings
- Printing Pastes and Inks
- Reaction Media
- Rust-Proofing Compounds
- Soluble Oils
- Surface-Active Agents
- Textile Soaps

PROPERTIES

Molecular Weight	118.17
Water Solubility	Miscible
Weight per U. S. Gallon	7.68 lbs. at 20°C
Refractive Index	1.427 at 20°C
Specific Heat	0.44 at 20°C
Heat Capacity	0.405 cal/ml/°C
Viscosity	17.2 minutes at 32°F
(Saybolt Universal)	2.9 minutes at 75°F
Flash Point	104.4°C (220°F)
Melting Point	Becomes semi-solid at -40°C with no crystal formation

SPECIFICATIONS

Specific Gravity	0.921—0.924 at 20°/20°C
Acidity	0.005% Maximum as acetic acid
Color	Water-white
Distillation Range	Below 190°C—none Above 200°C—not more than 2% 95% distills within 2° including 198°C
Non-Volatile Matter	Not more than 0.005 g per 100 ml
Water	No turbidity when 1 volume is mixed with 19 volumes of 60° Bé gasoline at 20°C

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Protecting Research Profits

by H. A. TOULMIN, Jr.
Toulmin & Toulmin, Dayton, Ohio

AMERICAN INDUSTRY HAS THRIVED under the encouragement of the patent system. The complexity of modern inventions has inevitably been reflected in the complexity of patent procedure, and the system is often attacked by those who are unfamiliar with its intricate workings. Here the author, a well known patent lawyer, makes more understandable those policies which have lent much to the prosperity and stability of our industrial structure.

THE SUBJECT of patents to establish the rights to inventions has always been a controversial one. Politically, the right to intellectual creations and new developments has been at the very heart of the movements that have led to the growth of the American nation. In dealing with research and invention, we are dealing with the very warp and woof of the fabric of American life. No man needs demonstration that our civilization has been, in a progressively increasing degree, founded upon the industrial activities of the American people. It is likewise equally axiomatic that all of our great industries have, at one time or another, or continuously, been founded upon patents. The same thing has been true of the other great industrial nations of the earth. Indeed, the prosperity of most of the nations of the earth has been reflected by the number of patents taken out by their citizens, as a sort of barometer of international success.

Early in our national history, the Supreme Court of the United States said:

> It is undeniably true that the limited and temporary monopoly granted to inventors was never designed for their exclusive profit or advantage; the benefit to the public or community at large was another and doubtless the primary object in granting and securing that monopoly.

Patents are of interest because they provide the means of the establishment of claims to scientific achievement. They present the opportunity to use them for the furtherance of research and to throw those results open to the public through patents, by preventing others from securing patents on the same subject for exclusive commercial gain. They are useful for rewarding younger research workers, and useful for financing further research. They are particularly useful in the control of inventions for the public benefit, so that they can only be produced by responsible manufacturers.

Patents define the accomplishments of the great intellectual explorers, for the unknown regions of science remain the beckoning uncharted territories for present day exploration, compared to which past geographical exploration is but a pygmy in adventure.

What Is Invention?

With this background let us turn and look at what is invention: It is the act of creating something new and useful in the industrial arts.

There is no restriction in the United States on who can be an inventor. It may be one man or many men. They may be deemed sole or joint inventors.

Recently the Supreme Court of the United States attempted to restrict invention to that thing resulting from a man's mental process that was defined as a "flash of genius."[1] I have found no one who could tell me what a "flash of genius" happens to be. If genius is a capacity for

Figure 1. Ownership of Patents

		OWN TIME		AT OWN EXPENSE					
	IDEA DEVELOPED ON COMPANY TIME		EXPERIMENT ON COMPANY TIME		REDUCTION TO PRACTICE AT COMPANY EXPENSE		TEST ON COMPANY TIME		MANUFACTURE ON COMPANY TIME AND MACHINERY	
(1)	A	A	A	A	A	A	A	A	A	A
(2)	C	D	C	D	C	D	C	D	C	D
(3)	A	A	A	A	A	A	A	A	A	A
(4)	A	A	A	A	A	A	A	A	A	A
(5)	B OR C	D	B OR C	D	B OR C	D	B OR C	D	B OR C	D
(6)	A OR B	B OR C	A OR B	B OR C	A OR B	B OR C	A OR B	B OR C	A OR B	B OR C
(7)	B OR C	D	B OR C	D	B OR C	D	B OR C	D	B OR C	D

(1) Employed to invent. (2) Employed but no contract to assign (not an executive). (3) Employed and contract to assign all inventions. (4) Employed and contract to assign inventions in line of manufacture. (5) Employed and contract to assign inventions, but invention is outside Company's line of manufacture. (6) Executive—no contract to assign inventions; invention is in line of manufacture. (7) Executive—no contract to assign inventions; invention is not in line of manufacture. (A) Outright ownership by Employer. (B) Non-exclusive license to Employer. (C) Shop right to Employer. (D) No ownership in Employer.

taking infinite pains and is evidenced by long, detailed work of an individual or many people, then I know what it is, but this other judge says that the result of joint work such as that is not invention. We find the decision of a noted judge, a former arch apostle of patent punishment in the Department of Justice disregarding a century of established law by holding that no patent can issue for the work of joint researchers in a laboratory.[2]

For more than one hundred years invention has been settled by the courts as producing something new and useful and the statute so defines it.

Invention is protected by patents. We have a mechanical patent, patent on a chemical compound or a process or we may have a patent upon a design or even upon a growing plant that is asexually reproduced. The patent so granted is not a monopoly in the sense that something is taken away from the public and given to the inventor.[3] A patent is merely a recognition of the right of an inventor who has created something that did not exist before to exclude others from taking his creation for a limited period of seventeen years in return for his prompt disclosure of his ideas to the world to stimulate others to go and do likewise.

The patent is evidenced in physical form by a statement of the object of the invention; it consists of a description of how the invented subject matter is constructed or operates and the results it secures, together with drawings illustrating the invention; and claims at the end of the patent which consist of numbered paragraphs defining the boundary of the territory of the subject matter the inventor has created. The inventor is like an explorer who stakes out a new claim on undiscovered property.

The Patent Office, when the patent application is filed, makes a careful review of prior patents and prior publications to see if the idea is new. It is necessary for the inventor to file his application within one year from the date of any publication or prior use or sale of offer to sell of the invention. It, therefore, becomes important that a research institution exercise great care in the policy of publications. The Wright brothers very nearly had their fundamental patent defeated because of an unwise publication of their research results.

Patent Ownership

The next phase of patents which is of interest deals with the ownership of patents. This refers to ownership not only from the point of view of the sponsor but also from the point of view of the research worker. There are many ways of compensating a research worker. I do not believe that ordinarily it pays nor is it professionally desirable for a research worker to retain any interest in the fruits of his inventive genius. I have made a large number of inventions on which patents have been granted and in no single case have I ever retained any interest in the invention, but I have donated the invention and the patent to my client without fee. The professional reason for doing so applies equally well to the research worker: we, who are trusted confidential servants in the professional world, should have no commercial interest in the product of our brains if we are to be loyal and trusted confidential associates.

This ownership of patents is a very complex matter: in order to reduce it to some sort of order I have placed the various conditions in the form of an accompanying chart. (See Figure 1.)

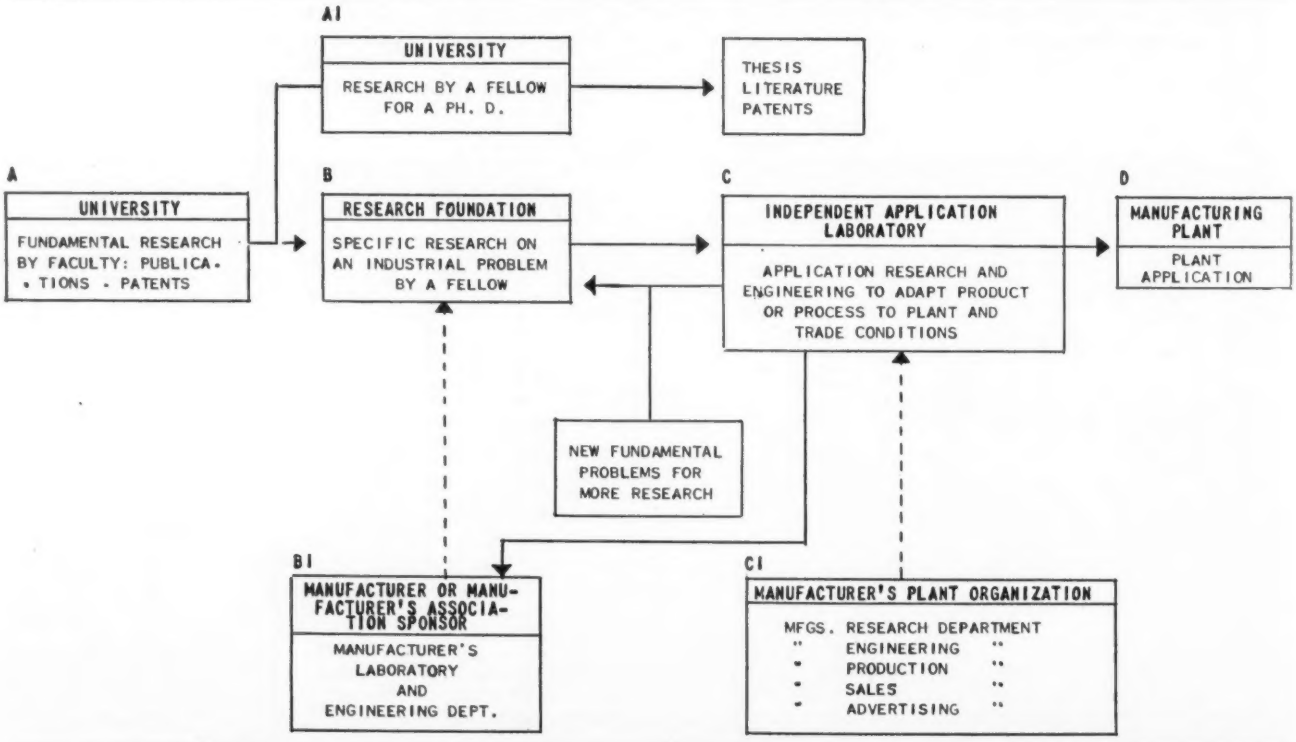
And going along with this question of ownership of patents is the relationship between a research institution or a university, between the independent research organization and the manufacturer. This relationship I have endeavored to show in the accompanying chart. Figure 2.

A long period is necessary under Government procedure for the preparation, filing, prosecution and allowance of a patent. Few people realize the great complexity of the procedure necessary to accomplish this result. There are normally over fifty major steps and sometimes nearly a hundred steps in the prosecution of even the simplest patent; and all of the steps are of major importance and must be performed according to a very meticulous Government time table.[4]

The manufacturer's development schedule is shown on chart B and indicates some of the major steps that must be taken from the idea to the completed product. You will note that the long research period is left out because it usually precedes the idea which results from the research investigation. The time of research should be added to this schedule.

As illustrated in Figure 3, the ideal schedule of production and patent protection is such that the two procedures

Figure 2. How a University Creates New Industries



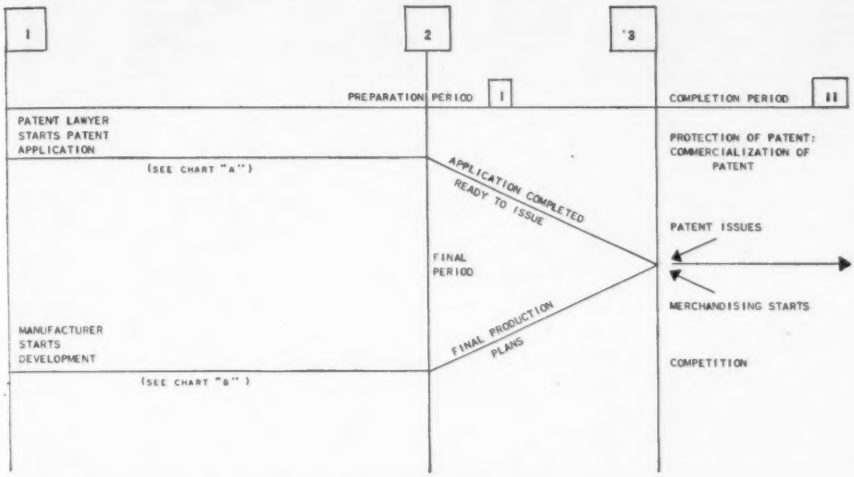


Figure 3. Time Schedule of Production and Patent Protection

run parallel and are finally brought to fruit simultaneously so that the product can be launched with patent protection.

Patent Protection

This brings us to the final chapter on the subject of patents: the protection of patents through the courts.[5] The number of patent suits that are brought are infinitesimal compared to the number of patents that are recognized as good and valid by competition in the trade.

Generally speaking, it is only the weaker patents that are the subject of controversy in the courts. While there are many exceptions to this broad statement, yet that is generally true. Therefore, those who endeavor to judge of the success of the patent system by the number of such weak patents that are continuously being defeated by the courts are premising their assumption on a wholly erroneous basis.

It is obvious that sensible business men usually settle patent controversies by way of license or conversion to non-infringing structures when patent litigation is threatened. Ignoring the few obstinate cases where strong valid patents are attacked by those who will not acquiesce in them, the great bulk of contested patents are in that category of questionable inventions where the question of whether the invention is good and valid is one that any honest man could debate.

The fact that the courts defeat a large proportion of the patents upon which litigation is brought only indicates this fact. Reformers would have us believe that the invention quality is going down in the United States, that the Patent Office makes grave errors in allowing patents, that there are too many patents and that the whole patent system is due for a thorough house-cleaning. Men who make such assumptions have no knowledge of the actual facts.

In conclusion, there are certain policies that should be established if one is to have a successful experience with patents. These policies are: ownership of patents; licensing and sale of patents; recognition of inventors; fair policies of determining who are the inventors; a system of keeping records and the policy of proving such records; and policies to insure that the patents are used in the public interest and not for the purpose of accomplishing a non-patent object such as a restraint of trade or a violation of the Antitrust Laws. It is significant that most of the abuse of the American patent system has come not from the system itself or its operation but from the abuse of the use of the patents by manufacturing interests who attempted to accomplish an illegal objective and violation of the Antitrust Laws.

Under our patent laws scientific developments and the results of scientific research in pure science cannot be monopolized by anybody.[6]

No patents are granted by the United States Government on scientific principles and ideas. Patents are only granted by our government on practical ways to use scientific discoveries. Therefore, United States patents never block scientific progress, because the achievements of the pure research institute and the college laboratory in scientific discoveries cannot be patented.

The launching of synthetic rubber by the E. I. du Pont de Nemours Company under the trade name Neoprene is a good example of this principle. Extended basic work in divinyl acetylene had been carried out by one or more college laboratories working in pure research. Such results, of course, were unpatentable. The du Pont company's research workers saw in this pure research a suggestion of how synthetic rubber might be developed.

Where the pure research left off, the development laboratory of the du Pont company took up the burden. After extended expenditures, the successful product was accomplished. One of the greatest contributions to national welfare was thus made because the specter, in time of war of being deprived of rubber, or in time of peace of this country being penalized for its rubber supplies by high prices, was removed.

Patent Licenses

One of the advantages of patent licenses is the use of them among various owners to form a basis of cross rental or licensing so that all can use the patents of everyone.

Assuming that a patent pool or cross-license arrangement provides a group of patents that cover a successful and modern product, self-preservation demands continued improvement of the product and invention covered by patents in order for the cross-license group to preserve its leadership because:

a. Commercially, unless its product has the latest improvements, a substitute competitive product will appear with such improvements that the licensed product will not find a ready sale.

b. The natural evolution and improvement of a product and its constant changes to adapt it to the varying needs of our country and to the different tastes of the people who must be persuaded to buy it inevitably bring about products that must be protected by more patents.

Under the patent laws of the United States as they are capably and fairly administered by the United States Patent Office, it makes no difference how much or how little money one has, one gets the same uniform treatment. One cannot "buy" patents from the United States Patent Office. The amount of brains the inventor has is the sole test before the United States Patent Office. This institution has been noted for its integrity and the ability of its personnel in applying this high and impartial standard in the granting of patents.

Such is the record. The undisputed facts confront the critics and refute their unsupported charges based upon generalities and discontent.

No system is perfect. No patent system is perfect. All people will never be satisfied with any governmental system.

When the patent system is confined to its legitimate and normal function it yields rich dividends in money, in stable business, in full employment and in substantial honors and awards for the fortunate inventors.

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[1] Cuno Engineering Co. vs. Automatic Devices Corp., 314 U. S. 84.

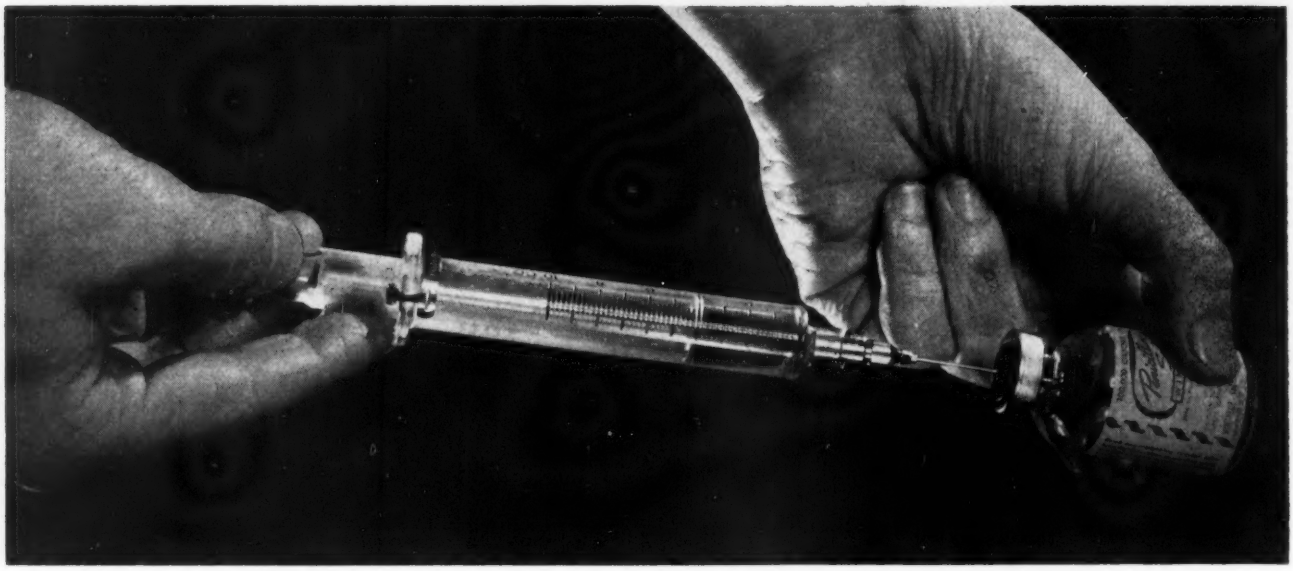
[2] Louis Potts and Teletype Corp. vs. Coe, 140 F. (2nd) 470—Reaffirmed 145 F. (2nd) 270.

[3] "Invention and the Law," H. A. Toulmin, Jr., Prentice-Hall 1938.

[4] "Graphic Course of Patentable Invention," *id.*, D. Van Nostrand Co., Inc. 1935.

[5] "Reminiscences and Reforms of the Patent Law," *id.*, address before the Franklin Institute of Mechanic Arts, February 19, 1941.

[6] "Report of the Committee on Patents," of the American Association for the Advancement of Science, January, 1934. Also, "Patent Rights for Scientific Discoveries," Harrison, Bobbs, Merrill, 1930.



A penicillin solution is made up by injecting distilled water from a 10-cc. syringe into the vial containing the powder.

CHEMOTHERAPEUTICS— A Growing Chemical Field

by THEODORE G. KLUMPP and C. M. SUTER
Winthrop Chemical Company, Inc., New York, N. Y.

CHEMISTRY AND CHEMICAL INDUSTRY are destined to play an increasingly important role in the conquering of disease and the search for longevity. The prodigious expansion of penicillin and the rapidly enlarging group of sulfa drugs are samples of what may be expected on a broader scale when postwar research gets under way in earnest. The authors here indicate some of the lines along which these developments are likely to take place.

WE HAVE COME to a cycle in the development of science in which chemotherapy has come to the front. The most spectacular achievements in medicine in the last decade have been made in this field. It is an interesting commentary on the evolution of interest in this field that 20 years ago it was considered a blind alley and the most hopeless subject for investigation. If history repeats itself, the bull market on chemotherapy will continue for perhaps as long as another decade, after which interest will undoubtedly shift to other fields of endeavor.

Modern medical therapeutics has developed to the point where it appears to be, and is, an exceedingly complex combination of art and science. From the standpoint of function, however, the physicians' armamentarium falls into simple classes:

(1) *Stimulants,* drugs that activate or enhance one or more bodily functions. In this class are caffeine, epinephrin, ephedrine, pilocarpine and physostigmine.

(2) *Depressants,* drugs that act by retarding, neutralizing or otherwise overcoming one or more bodily functions. Representative members of this class are the anaesthetics, the barbiturates, aspirin and Demerol.

(3) *Biological supplements.* These drugs are given ordinarily to compensate for a deficiency of one of the natural hormones, enzymes, or other elements ordinarily present in the body. Treatment with drugs in this class is commonly referred to as "Replacement Therapy." Included in this group are such hormones as insulin, thyroid and estrone, enzymes such as pepsin and such simple substances as water and sodium chloride.

(4) *Diagnostic agents.* These are tools employed to give information about particular structures or functions. The best known examples are the various radio-opaque materials such as barium sulfate, bismuth, and Diodrast which cast a shadow on the X-ray film or fluoroscopic plate. Other materials are used for testing liver, gastric and kidney function.

(5) *Anti-infectives.* This class may be further subdivided into biological and chemical anti-infectives. Belonging to the first are the various anti-virus agents such as cow-pox, vaccinia, distemperoid virus, antitoxins such as diphtheria antitoxin, and antibodies such as antimeningococcus serum. Arsphenamine, quinine, emetine, antimony compounds, Atabrine, the sulfonamides, and penicillin are representative of the second group.

From the standpoint of therapeutic objective there is an interesting distinction

between the agents in the first three classes and those in the last two. The former are administered for the purpose of influencing bodily function and structure. They are serviceable only as they have this effect. In contra-distinction, the substances in the latter categories are most serviceable when they act without interfering with structure or function. Penicillin is remarkable not so much because of its potent antibacterial action, but because it exerts its effect *without* disturbing bodily function or structure. Other antibiotic substances acting like penicillin, such as gramicidin, have a similar effectiveness against bacteria, but are not equally useful because they exert a deleterious effect upon the body.

Combating Infection

The term chemotherapy, which in its broadest application includes all chemical agents exerting a therapeutic effect, has been applied in a present-day restricted sense to the treatment of infections by chemical agents. Infections in the broadest sense may be caused by bacteria, viruses, molds, fungi, parasites such as the protozoa causing malaria, or worms gaining access to the body.

The ideal chemotherapeutic agent is one which destroys or prevents the multiplication of the invading organisms without disturbing the functions of the body cells. Not many years ago such an ideal was considered unattainable because it was believed that human and bacterial protoplasms are so similar that a chemical agent that destroyed one would of necessity at least injure the other. The long-known examples of chemotherapeutic action—the suppression of malaria with quinine and of syphilis with Ehrlich's arsenicals—came to be regarded as freakish good fortune; the likelihood of extending chemotherapy to bacterial and virus diseases seemed to become less as the years passed. However, the discovery of the sulfa drugs, synthetic antimalarials, and penicillin has changed pessimism to optimism and has made anti-infective chemotherapy the field of medical research that is most intriguing today.

Cancer and Longevity

While chemical warfare against infections is important to human health, welfare and longevity, it is by no means the most important field of chemotherapeutic research in the broadest sense. For instance, the conquest of cancer by chemical means offers a great challenge for the future. Cancer causes far more deaths than do infections, and yet only recently have we successfully broken the ice in the chemotherapy of cancer. The employment of diethylstilbestrol in the treatment of cancer of the prostate is a great milestone in chemotherapy since it marks the first successful use of a simple chemical compound in combating cancer. It is perhaps only a small step, since diethylstilbestrol merely retards the cancer and does not cure it, but nevertheless, it opens a new field with limitless possibilities.

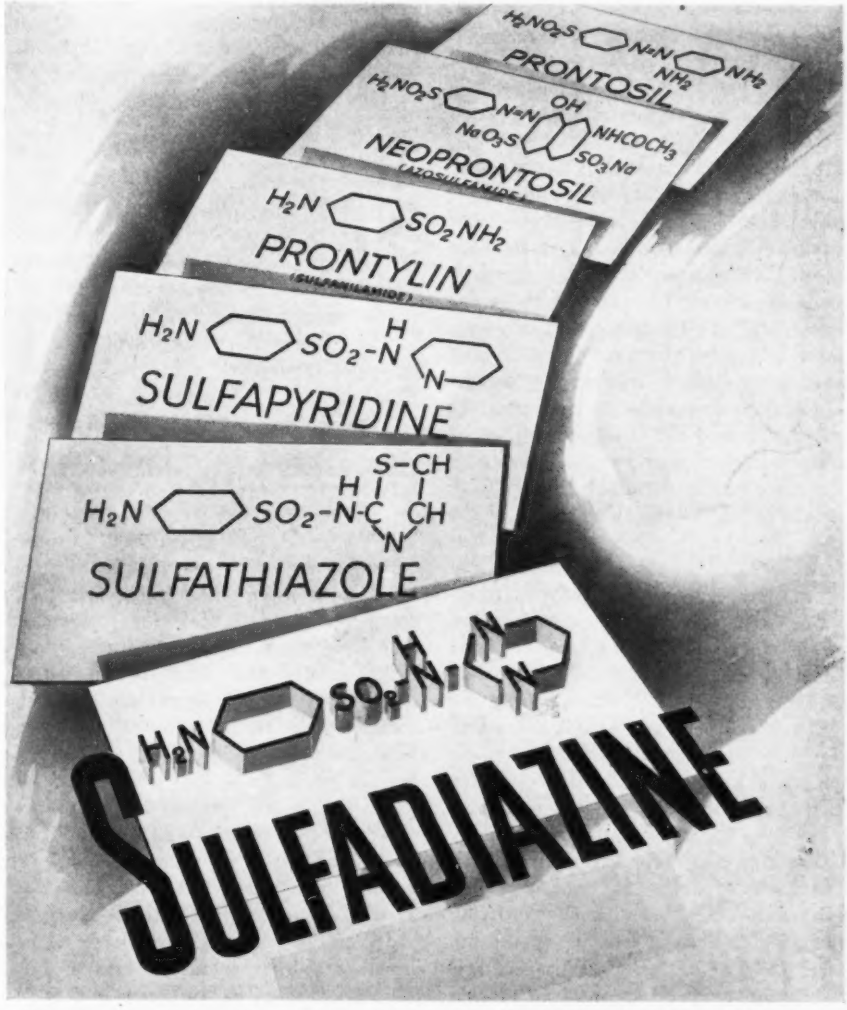
Perhaps even more important than the treatment of cancer is the need for a chemotherapeutic approach to the problems of longevity. The changes that occur in the aging process are chemical in character. Aging is a chemical reaction that proceeds in one direction, but the most significant thing about this chemical reaction is the fact that it proceeds at different rates in different individuals and in different races. Were this not true there might be some justification for pessimism in thinking that perhaps this process of growing old is beyond power of man to influence; but the very fact that some individuals are able to survive as long as 135 years, while others are obviously worn out and broken down physically at 45, offers the possibility that we may be able to find out some day wherein these individuals differ chemically. The employment of this knowledge may enable us to prolong the lives of those that are spent too soon.

Obviously, the reagents entering into the reaction of aging vary widely either quantitatively or qualitatively. Our next job is to identify the reagents and determine wherein they vary from individual to individual. Ultimately it will be the task of the chemotherapeutist to alter the chemical reactions of the short-lived individuals so that they will conform with the pattern established by those who lead the procession to the present-day goal of at least 130 years. Is there any subject in the field of science that is more important or offers a greater challenge to the chemist of the future?

Therapeutic Agents from Nature

The manifold contributions of chemistry to chemotherapy can be grouped into a few classes. One of these is the isolation of pure compounds from crude natural products.

The treatment of malaria by powdered cinchona bark represented a great step forward in the control of this scourge but left ample room for improvement. The bark was uncertain in potency because of the variation in percentage of the active ingredient and also, as was found later, because the mixture of quinoline alkaloids found in cinchona bark contains a variable proportion of quinine. Hence the use of



The chronological development of the major sulfa drugs is shown above. The basic structure of sulfanilamide has been modified to obtain compounds of superior effectiveness.

this alkaloid as an antimalarial agent could hardly be put on a completely rational basis until the isolation of the pure compound in 1820 by Pelletier and Caventow, nearly two hundred years after the first Europeans used the crude bark for treating "the ague."

The first active material extracted from the medium on which a variety of *Penicillium notatum* had grown was impure indeed, and here again through intensive laboratory and production research it has been possible to isolate the pure sodium salt of penicillin, the active ingredient of the metabolic solution.

Commercial penicillin sodium is not yet a chemically pure product because of the expense at the present time of a complete purification, but this goal is being rapidly approached. Again, the elimination of impurities has improved medical practice not only by eliminating nonessential and irritating material but in obtaining a product pure enough to be stable under ordinary conditions for a reasonable period of time. One of the difficulties in the early work with penicillin was the loss in potency of the crude preparation on standing for short periods.

Structure Determination and Synthesis

If the chemist could do no more than isolate the active compound from a plant or animal source, his opportunities for improving natural products would be limited. The next step after isolation of an active substance is to determine its chemical structure and thereby learn what type of atomic arrangement in a compound results in therapeutic action against the particular organism that is to be controlled. Structure determination of a complex molecule such as that of quinine may require the intensive effort of scores of workers over a period of many years. Once the structural formula is determined, however, an invaluable aid to progress has been gained. It is the experience of workers in chemotherapy that the activity of a compound is not highly specific; i.e., a slight variation in the structure of the molecule will change its value as a chemotherapeutic agent. It probably will not destroy the activity and may even increase it considerably. For example, not only is there a whole family of cinchona alkaloids, many of which show antimalarial action similar to that of quinine but a host of synthetic compounds containing the quinoline nucleus of quinine show activity against the malaria *Plasmodia*. Hence structure determination is followed by efforts to synthesize not only the natural compound but many related substances. Judging by experience one can assume that the naturally occurring compound is not the most potent one in its group. For instance, quinacrine (Atabrine), the synthetic antimalarial now in common use which is a heterocyclic compound not unrelated to quinine, is several times as active as the natural alkaloid.

The chemistry of emetine is far from complete because the compound has not been synthesized. Furthermore, the preparation of related compounds that are more active in amebiasis than emetine has not made much progress. Here, then, remains a challenge to the organic chemist in the designing and building of new organic structures.

The number of possible variants in the structure of a complex organic molecule is limited only by the imagination of the chemist, but the majority of these new structures may be exceptionally difficult to prepare in the laboratory. Since there is little chance of knowing at the beginning what change will be most advantageous, the new compounds first synthesized are often the ones that can be made with the least cost in time and energy.

Not only is there usually a whole family of compounds showing activity against a particular pathogenic organism; there is also a lack of specificity of action in the sense that one compound will probably destroy a number of species of organisms, although its lethal effect will vary from one to another. From this, one can expect, for example, that eventually there will be available a whole series of penicillins, one more effective against pneumonia infections, while another, with a slightly different structure, will have advantages, say, against the spirochete of syphilis. Evidence is already accumulated that there are several forms of penicillin having different degrees of activity against various organisms.

To summarize, it is a province of the organic chemist to determine the structure of naturally occurring therapeutically active compounds and then to synthesize them and many similar structures in the expectation of improving on the natural products.

Contributions of Chemical Industry

Not all compounds of value in chemotherapy are isolated from natural sources or closely resemble natural products. There are no sulfa drugs or even sulfonamides of any description in nature so far as is now known. Neither are there complex arsenic or antimony compounds that have been extracted from this or that source. How then was it determined that such compounds are useful in medicine; and what is more important, how can more such compounds be discovered?

During the past seventy-five years organic chemists in industrial and university laboratories have synthesized several hundred thousand carbon compounds that have no counterpart in nature. The majority of these have been made from the simple aromatics occurring in coal tar, but since 1920 an increasing number have come from petroleum as the raw material. From time to time facilities have been available for testing series of these compounds for their value as chemotherapeutic agents even when they were originally prepared for other purposes.

There is no way of accurately determining what percentage of the organic compounds that have been synthesized have been subjected to any type of testing as therapeutic agents, but the figure is undoubtedly small. Fortunately for the human race, one series of compounds that was tested against bacterial infections in the early 1930's was a series of red azo dyes prepared by Mietszch and Klarer in Germany. One of these, "Prontosil Rubrum," was found to be effective clinically in blood stream infections due to the streptococcus. Not long thereafter the French workers, The Trefouels, Nitti and Bovet, found that the urine of patients was bacteriostatic after the administration of the dye, even though the original compound was not excreted. The colorless active substance in the urine proved to be sulfanilamide, a compound which had been made and described by Gelmo some thirty years earlier. Following these observations there occurred the tremendous amount of research on sulfa drugs with the results now familiar to everyone.

A consideration of the manner in which sulfa drugs were discovered is of value in planning the progress of chemotherapy. It is obvious that many of the organic compounds described in the literature of chemistry might find a useful place in medical practice if they could be given extensive tests. It seems hardly feasible, however, for the research staffs of pharmaceutical companies to undertake to repeat any large fraction of the synthetic work already on record. When faced with the alternative of preparing an old compound or a new one where both have equal potential value, the laboratory worker prefers to synthesize the new compound. Not only does he make a more tangible contribution to chemistry, but our patent laws make it possible for the person who discovers a new and useful compound to secure more adequate protection for his rights than if the compound is one already known.

The great majority of compounds so far found to be useful in chemotherapy contain nitrogen and show at least a slight solubility in water. It would, therefore, seem implausible to prepare compounds, old or new, for testing as therapeutic agents that do not fulfill these qualifications. Every organic chemist who prepares a series of nitrogen-containing compounds, particularly when they are of a new type, should make every effort to have at least preliminary trials made of their activity against pathogens.

Metallo-organic Compounds

For hundreds of years various inorganic compounds of mercury, arsenic, antimony, and bismuth have been used in

A physician makes an intramuscular injection of 20,000 units of penicillin dissolved in 1 cc. of diluent. This is the most acceptable mode of administration at the present time.

medicine with real or fancied benefits. These have the objection, however, that a dose large enough to produce beneficial effects is often injurious to the body tissues. It is not surprising, then, that when the necessary chemical methods became available, these elements were introduced into organic compounds.

The classic example of a study of this kind was carried out in Ehrlich's laboratory, where it was found in 1909 after making hundreds of new compounds that arsphenamine (Salvarsan) and closely related substances were useful in the treatment of syphilis. Interest in organic arsenic derivatives has continued almost unabated to the present, and interesting new compounds are still being discovered. African sleeping sickness is treated with "tryparsamide," amoebic dysentery with "Carbarsone," and recently γ-(*p*-arsenophenyl)-butyric acid, first prepared in 1940 at Johns Hopkins, has been reported to have an action on the organism, *Schizotrypanum cruzi*, responsible for chagas disease, a South American variety of sleeping sickness. Even if penicillin proves to be a more satisfactory remedy for syphilis than the arsenicals now employed, it may be expected that certain tropical diseases not affected by penicillin will require arsenotherapy.

The history of antimony therapy is analogous to that of arsenic. Tartar emetic, an antimony salt of tartaric acid, has been found effective against a number of tropical diseases caused by animal parasites including kala-azar, bilharziasis and filariasis. Here again improvement has been sought through organic antimony compounds. Several of these derived from stibanilic acid have been found to be superior to antimony salts in the control of the tropical infections already mentioned.

The field dealing with the organic chemistry of antimony is a particularly difficult one, but the results obtained thus far seem to warrant further synthetic and pharmacologic studies.

Mechanism of Drug Action

The chemotherapeutic agents now in use have been discovered by empirical rather than theoretical methods. A clue furnished by the observation that a product such as cinchona bark or a naturally occurring material had a useful therapeutic action has led to intensive investigation of many similar compounds until drugs superior to the original have been produced. Alternatively, numerous compounds prepared in plant or laboratory for various purposes have been tested routinely for chemotherapeutic activity.

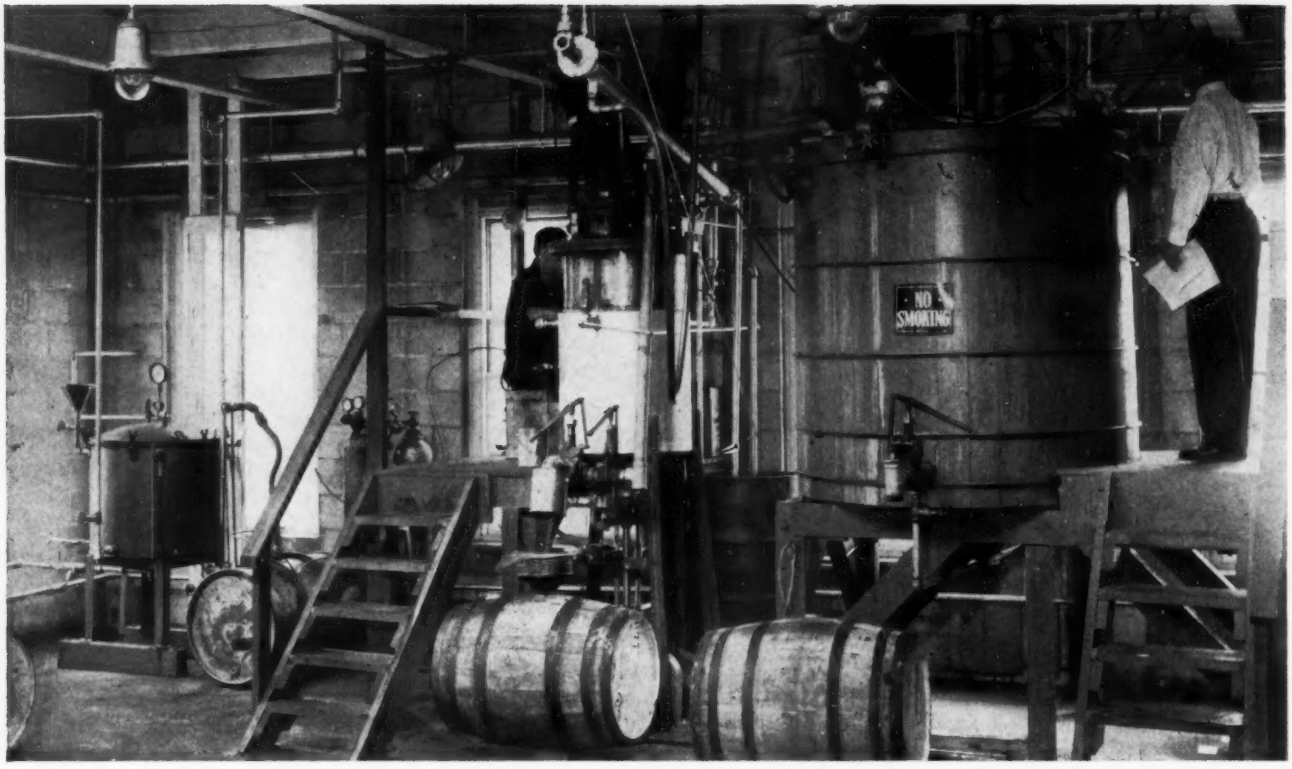
It is obviously desirable to replace such expensive and tedious processes by a more direct method. To this end it would be of value to learn something of the mechanism by which compounds now used in chemotherapy destroy pathogenic organisms. A good beginning has been made in the interesting collection of data that deal with the activity of sulfa drugs. Sulfanilamide and the other well-known drugs in this group are rendered ineffectual by the presence of *p*-aminobenzoic acid, one of the vitamins of the B complex. It has been suggested that a sulfa drug stops the growth of a bacterium by taking the place of *p*-aminobenzoic acid in an important enzyme system of the organism. This modified enzyme is then not able to function; hence the bacterium does not respire and multiply normally and falls prey to the body's defenses.

This relatively simple representation of what occurs was satisfactory until it was found that the antibacterial action of sulfabenzamine (Sulfamylon, Marfanil, homosulfanilamide) which differs from sulfanilamide by having a methylene group between the amino group and the benzene ring ($H_2NCH_2C_6H_4SO_2NH_2$), is not repressed by the presence of *p*-aminobenzoic acid. Therefore this and certain other sulfa drugs must be effective through some other as yet unknown mechanism.

From this work on sulfa drugs has developed the concept that a chemotherapeutic agent may be devised by first determining what vitamins or other relatively simple organic substances an organism needs for normal growth, and then preparing a compound similar enough to one of these to replace it in an enzyme system where it will interfere with the organism's multiplication and growth. This intriguing idea captured the attention of a number of investigators and some progress has been made in synthesizing so-called anti-vitamins. It is too early to know how fruitful will be this approach to chemotherapy, but it does provide an alternative to the purely empirical procedure. However, the alternative still requires the synthesis of many compounds after an essential growth agent is discovered, because the term "similar compound" is open to a multiplicity of interpretations and there is no way of knowing in advance which of these will yield the best results.

Summary

It is clear from what precedes that the development of chemotherapeutic agents requires all of the skills and resources that chemistry can contribute. An active compound that occurs in a complex natural mixture must be isolated, its structure determined, and then this and related compounds synthesized. Chemical industry as a whole is depended upon to furnish a continual flow of new compounds on the assumption that a small percentage of them will have value as drugs. Elements which show promise of therapeutic value in the form of inorganic salts frequently become much more useful when incorporated into complex organic structures. Although noteworthy progress has been made in this field, much further work remains to be done.



A corner in the new resin emulsion polymerization plant of American Resinous Chemicals Corp. Although designed for pilot work, the plant is being used for regular production until additional larger capacity can be installed.

New Resin Emulsion Polymerization Plant

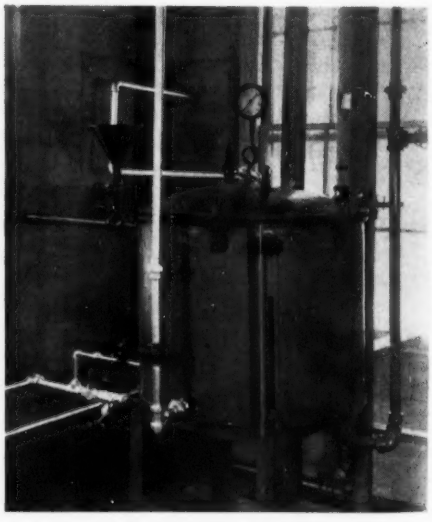
RESIN EMULSIONS ARE A promising group of coating, impregnating and adhesive-base materials. A new polymerization plant for their manufacture has been put into operation by American Resinous Chemicals Corporation at Peabody, Massachusetts.

TO FILL the growing military requirements for resin emulsions and at the same time looking toward postwar expansion of demand for this type of product, American Resinous Chemicals Corp. has recently completed a new emulsion polymerization plant at its Peabody, Mass., works. The plant is designed primarily for pilot work and eventually will be used exclusively for that purpose, but until additional capacity is provided it is operating on a regular production schedule.

Resin emulsions are new commercially in the last ten years. They are used principally as impregnants, laminants, adhesive bases, and in large volume as protective and decorative coatings.

As the name indicates, they differ from other types of coatings in that they are applied as finely dispersed resin-water mixtures rather than as a solution as in the case of lacquers and varnishes. Because they do not require a solvent medium they are safer to handle and generally more economical than lacquers. They can be made less viscous for a given solids content, and the dispersed state of the resin frequently makes them more adaptable for applications involving penetration of and adhesion to porous or rough materials such as paper, cloth and leather. For the same reason, however, the emulsions do not give the film continuity and high gloss of a lacquer finish, although research to improve these qualities is under way.

Water emulsions of a number of different types of resins—natural, as well as synthetic monomers and polymers—are being made by American Resinous. The research program of the company includes extensive investigation of all types of resin co-polymer combinations, with special emphasis on the mechanism of emulsion polymerization, i.e., polymerization of the resin monomer or monomers while



Semi-continuous still with glass column, in which resin monomers are distilled to remove inhibitors and other impurities.

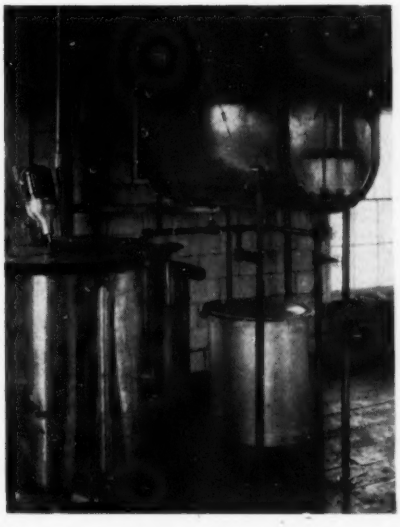
Polymerization laboratory at American Resinous Chemicals Corp. The research program of the company includes investigation of many types of resin co-polymer combinations, with special emphasis on their suitability for emulsion polymerization.

in the emulsified state. Where the final product is desired in an emulsified form, emulsion polymerization has been found to offer advantages in handling and control over polymerizing first and then emulsifying.

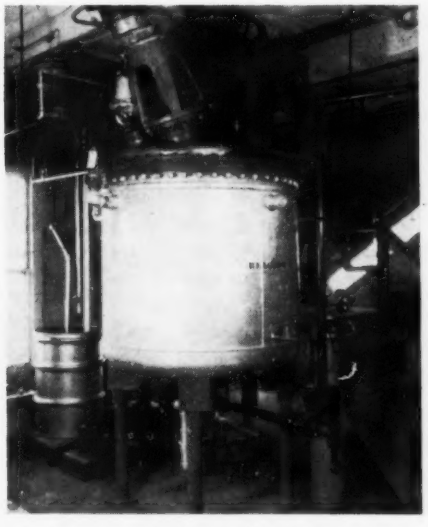
The new polymerization plant involves a unique step in which the emulsification and polymerization of the resin monomers are accomplished in the same operation. Following the process through the plant, the resin monomers are received in tank-car quantities and pumped to underground storage tanks, from where they are withdrawn in batch quantities and distilled in a semi-continuous still with glass column and condenser to remove the polymerization inhibitor and any other impurities. From the condenser they go directly to a receiver which is fitted with refrigerating coils as a precaution against premature polymerization. The required batch amount of monomer is then run into a blending tank where it is mixed in proper proportion with the polymerization catalyst and other ingredients, and this charge mixture in turn is dropped to an 18-8 stainless steel water-jacketed reactor, where the emulsification and polymerization are carried out.

Temperature and pressure during the polymerization step are automatically controlled. If the temperature of the reaction gets out of hand a solenoid valve turns on automatically before the danger point is reached and looses a rush of water at 5 deg. C. into the jacket of the reactor. This is colder than the water circulated during normal operation.

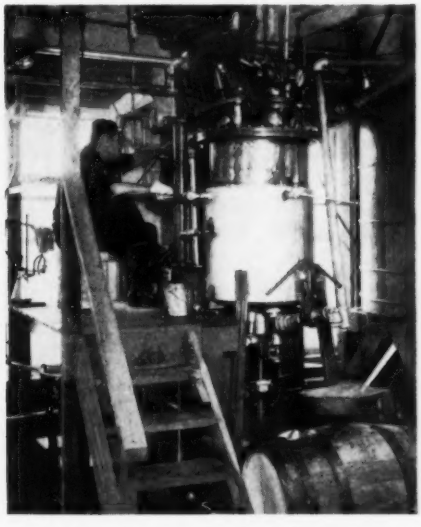
The plant is equipped to handle acrylic, styrene, allyl, isoprene and vinyl monomers and their co-polymers, and in fact the present apparatus was designed to be of use in possible eventual manufacture of the monomers themselves. As soon as equipment is available the company plans to expand its present polymer production several fold.



Distilled monomer is collected in refrigerated receiver at right, then blended with other ingredients in tank at left.



Jacketed reactor for emulsification and polymerization. Temperature in the reactor is automatically controlled.



Experimental runs are carried out in this 50-gal. reactor which is designed to duplicate conditions in the larger vessel.

PLANT OPERATION

AUTOMATIC CONTROL, Its Fundamentals

by DONALD P. ECKMAN, Engineering Department
The Brown Instrument Company
Division of the Minneapolis-Honeywell Regulator Company

THE MOST complete realization of the potentials of both war and postwar production calls for a thorough acquaintance with the fundamentals of automatic control. The advent of peace will assure more time for study, but it will be found that a more complete appreciation of the present knowledge will ease war and postwar production demands.

INSTRUMENTS, particularly controllers, have become, increasingly, the only means of meeting wartime demands for greater output, higher quality and higher operational efficiency. With a promise of an increase in both domestic and foreign commodity competition after the war, plus an even greater competitive wage situation due to world conditions, all three factors—quality, efficiency and speeds—will be the basis for American industrial success. That success, can be attained in great part through a realization now of the important fundamentals of automatic control.

Proportional Control is a mode of control which positions the control valve in accordance with magnitude of the controlled variable. This control function is largely stabilizing and, if not too great, forces the controlled variable to line out at some point. It will not prevent permanent deviation from the control point when the load changes.

Reset Response provides an additional increment of valve position in proportion to the deviation and the time of deviation of the controlled variable from the control point. This control function has very little stabilizing effect but, if not too great, tends to prevent deviation from the control point for changes in load.

From these definitions it is obvious that the control system and the process must be considered together as a dynamic unit, since a change in one part affects the whole system. Thus, automatic control must always be measured in terms of moving or dynamic conditions, not steady or static conditions. One proof of this is shown by the fact that a deviation must be detected before the controller can act.

Action of Control Responses

Disregard the process for the moment, and study the pen and valve movements when proportional and reset responses are used in the control system. Figure 1, Curve A, shows a deviation that has been chosen as an example, the control valve being by-passed so that no control action results from its movement.

From the definition of proportional control, valve position is proportional to the deviation. Curve B shows the valve movement that would result from this deviation when a proportional controller is used. Note that this curve is similiar to the deviation curve. A proportional controller always has the characteristic that a certain pen position is accompanied by a certain valve position. Stated in other words, the rate of valve movement is always proportional to the rate of pen movement. In actual practice this recovery action would result from a very temporary change in load, the load returning to exactly its previous value.

In the definition of reset response, the valve position was found to be proportional to deviation and time of deviation. Suppose that, at the time interval marked "dt" on the time axis of Curve A, the deviation in temperature is D as shown.

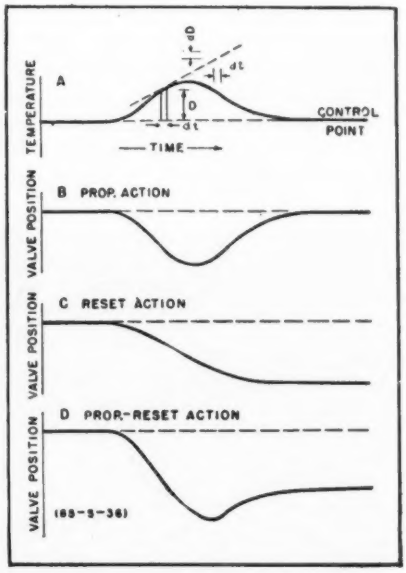


Fig. 1—Valve movement under the influence of various control actions.

The definition of reset shows that during time dt the valve will move an amount proportional to D times dt.

If we start at the beginning of the deviation and move the valve at each dt

cf. "Automatic Control, Its Practical Application," I and II, Steinkamp. Chemical Industries. Vol. 54. pp. 199-202 (1944); III and IV, pp. 372-6, 445.

an amount proportional to Ddt, the valve will move as in Curve C. What really has happened, is that Curve C represents the area under the deviation curve and the reset has integrated or added the sum of the small Ddt areas. But reset response is generally used in conjunction with a proportional controller and these two effects must be added together as shown in Curve D which results from addition of Curves B and C.

In actual practice, this recovery curve would occur on a permanent change in load, reset response having closed the valve an additional amount to maintain the temperature at the control point.

It is easy to show how the controller actions bear a definite relationship to the deviation. These actions may be combined into an equation and it is surprising to discover how well automatic controllers follow a definite relationship.

First, in reset action, valve position is proportional to the area under the deviation curve. As before, this area was obtained by adding all the deviations multiplied by the time at the deviation. In proportional action, valve position is proportional to the deviation.

We may combine these actions and show the valve position at any time as an equation:

$$V = K_1 \int_{t_1}^{t_2} \underset{\text{(reset)}}{Ddt} + \underset{\text{(proportional)}}{K_2 D}. \quad (1)$$

V = Valve position
K_1 = Reset rate-adjustable constant
D = Deviation of variable from control point
K_2 = Proportional band-adjustable constant
t = Time

If a controller does not have all these responses the approprate term is zero. Thus, a proportional controller would be

$$V = K_2 D. \quad (2)$$

Equation (1) represents the first two terms of an infinite series. Thus it might be possible to add to the controller response the higher members of the series, however, a controller built to include many higher derivatives, even if electronic in nature, would be far too complicated and expensive. From a practical standpoint, proportional response alone is sufficient to handle most processes.

Process Characteristics

All processes are more or less complicated arrangements of a number of capacities, transfer lags, and dead times. The extent of these factors determine the complexity of the control problem.

Capacity produces a retardation, not a delay, by the ability of sections of the process to absorb energy without causing an immediate full rise in potential in the manner that an electric capacitor absorbs electricity and thus delays the rise of voltage until it is charged. The ability of the brick walls in a furnace to absorb heat, the volume of liquid in a tank which affects the liquid level, and the amount of steam required to raise the pressure in a steam cooker, represent capacity.

Transfer Lag is a retardation, not a delay, caused by the potential drop between separated capacities or over distributed capacity in the process. This can be compared to an electrical resistor between two electrical capacitors. The temperature drop across a boiler tube or a heat-exchanger tube, the pressure drop across a valve connecting two tanks, or the temperature drop across an insulating wall represents transfer lag resistance.

Dead Time is a pure time delay arising from the necessity of transporting a mass of liquid, gas, or solid from one point to another. The distance between a heat exchanger outlet and the thermocouple and the distance between a control valve and the fuel burner both represent a small but sometimes appreciable dead time during which time no change can be effected.

Not only the process itself, but the measuring and control systems have capacity, transfer lag, and dead time. Figure 2 shows a typical process with all the various sections which make up the system. All processes or controllers do not have this arrangement, some having fewer and some having more component parts.

Consider the actual characteristics that enter into each of the blocks in the diagram. Assume that the process is a fuel-fired water heater and that we wish to know what each of the blocks in the diagram represents.

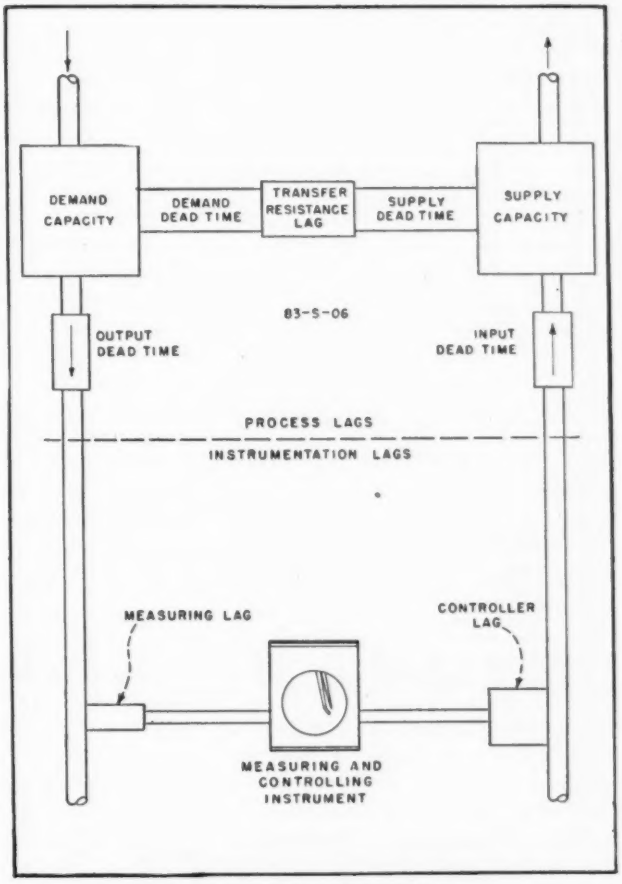


Fig. 2—Diagrammatic relationship between the sections of a typical process.

Input Dead Time is the time that is required for the hot gases or flame to travel from the firebox to the water tubes.

Supply Capacity is the heat storage capacity of the firebox.

Supply Dead Time is the time required for hot gases or flame to travel from firebox to water tubes.

Transfer Resistance is the resistance to heat flow across the water tube from gases to water.

Demand Dead Time is the time required for water to flow from water tube to header.

Demand Capacity is the heat storage capacity of water in tubes and header.

Output Dead Time is the time required for heated water to flow from the tubes or header to the point where the thermocouple or the thermometer bulb is located.

Controller Lag is represented by the heat capacity and resistance to heat flow in the thermocouple or thermometer bulb and its protecting wall.

Measuring Lag is represented by the lag of the control valve response—in

electric control by the speed of the motor valve operator; in pneumatic control by the pressure storage capacity of the valve topwork.

Process Reactions

In order to illustrate the effect of capacity, transfer lag, and dead time, we may study the effect of changes in fuel flow upon the reaction of the furnace or other process. This method has been used previously to illustrate controller action by observing the valve action resulting from movement of the pen. Process characteristics are illustrated by moving the control valve and observing the furnace temperature.

The reaction curve is simply the curve of temperature (or other variable), versus time, that would be drawn by a recording instrument if the control system were disconnected from the instrument and a change made in the control valve position. This may be done on pneumatic controllers by disconnecting the line leading to the valve, and connecting to a separate air supply. By varying the valve pressure a known amount, the temperature would rise or drop to a new value.

Figure 3 shows the effect on the reaction curve of three characteristics which greatly influence automatic control: Capacity, transfer lag, and dead time.

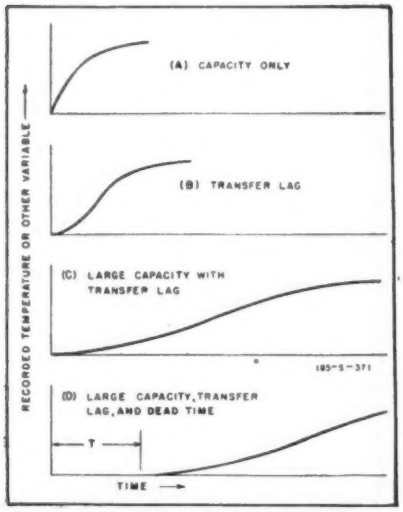


Fig. 3—Effect of capacity, transfer lag, and dead time upon the reaction curve.

The effect of capacity in a process is shown by Curve A. Capacity allows the temperature to change instantly when the control valve is moved but the temperature gradually approaches a final value—a typical logarithmic reaction. This type of process reaction is desirable since it provides instantaneous response of temperature but slows down the response sufficiently to provide stability. A reaction such as shown by Curve A is an ideal which is rarely ever obtained. When a second capacity is associated with the process a transfer lag is generally caused as shown by Curve B illustrated by the slow initial response to valve movement gradually building up to a maximum. Note that this reaction differs greatly from that of a single capacity.

The effect of transfer lag, a very important consideration in automatic control, may be caused by any additional retarded response in the process or in the control system. The effect of transfer lag arises from:

1. Supply capacity
2. Distributed capacity
3. Measuring lag
4. Controller lag

Since transfer lag is nearly always detrimental to automatic control all four conditions above must be avoided whenever possible.

By using greater process capacity the effect of transfer lag may sometimes be overcome as illustrated by Curve C. Transfer lag is indicated by the slow initial rate of change of temperature. A much greater process capacity is illustrated by Curve C than by Curves B or A.

Dead time is the cause of much difficulty in automatic control. When dead time exists, as shown in Curve D, a control valve movement cannot be made effective until the dead time period has passed. Therefore, any deviation which occurs during the dead time period cannot be corrected.

In automatic control, it is usually outside disturbances or load changes which cause the major difficulty, and not control of the variable itself. Also, the lags in the measuring and controlling systems of the controller form a very important part of an automatic control application, especially when process transfer lag and dead time are small.

Practical Aspects

There are several other factors entering into control which produce relatively great improvements in the quality of control that might also be called "fundamentals."

Any reduction of the dead zone of the measuring system causes improvement in the quality of control, especially for processes having large capacity and transfer lag.

To show how this comes about the reaction curve for a process having capacity, transfer lag, resistance, and dead time, has been redrawn to a larger scale and only the deviation from the control point shown in Figure 4.

This is the beginning of deviation from the control point and, from the time that the deviation started at eight minutes until the deviation is several percent of the controller scale, the control system should begin to function. However, in most measuring systems there is a small zone through which recording is insensitive, that is, the variable (temperature in this case) has changed but the controller fails to detect this change. This dead zone has variously been called "dead spot," "tapping error," and "neutral zone" and is usually attributed to the measuring system but may also exist in the control system. Pneumatic controllers are sufficiently sensitive to enable the control system to begin to function as soon as the pen or pointer begins to move.

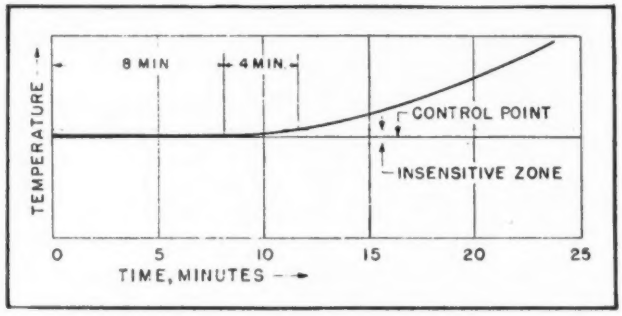


Fig. 4—Effect of dead zone upon the control system.

In Figure 4, the dotted lines above and below the control point represent the width of the dead zone. In this case, the control system does not function until the temperature exceeds the dead zone and it is necessary to wait for 4 minutes before corrective action is made. These 4 minutes are in addition to the dead time already existing in the process and control system.

Since it has already been indicated that dead time is the cause of one of the most serious difficulties in control, a dead time in the controller further complicates the problem.

An improperly located or poorly installed measuring element results in poor control as well as inaccuracy of measurement.

Much has been said and written concerning the effect of poor thermocouple or thermometer bulb installations on the accuracy of temperature measurement. Its effect on automatic control, however, is not so immediately obvious.

Consider an ordinary thermocouple well. A large loss of heat will occur along the protecting well and heat will be lost to the atmosphere because of the length of protecting well outside the pipe. This loss decreases the heat available at the

thermocouple tip and slows the temperature reaction at the controller.

Installation of a well in a horizontal position will allow dirt to settle on the tube at low gas velocities and the additional mass of the dirt increases the thermal capacity. The resistance to the flow of heat from the air to the protecting well is increased if the thermocouple tip is located in the low velocity area near the outside of the pipe. This increases the measuring lag with the resultant slower temperature response.

The location of the thermocouple downstream from a bend in the pipe causes unnecessary fluctuations of temperature at the thermocouple because of the gases eddying around the bend. Usually a thermocouple and protecting well has enough mass to smooth out those fluctuations.

These general principles apply to the installation of almost any primary measuring element. Very careful consideration should be given to the losses and to the mass of the detecting element because they very greatly increase the lag of measurement.

Make sure that the control valve is properly installed and that it is the type best suited to the job.

In addition to the choice of lift-flow characteristic for a control valve, it is most imperative that it operate smoothly, that is, have an even change in flow for each change in lift or rotation. On pneumatic control valves this involves maintaining adequate lubrication of the stem and repacking at frequent intervals. The average pneumatic control valve, when properly maintained, operates satisfactorily, but friction at the valve stem which causes sticking can seriously reduce the number of available valve positions. For this reason, there should be no hesitation in using a valve positioner, even if the sticking is only moderate. A valve positioner should always be used, of course, when the proportional band is set to wide values.

Electric motor-operated valves should not be operated with the shaft vertical because thrust causes excessive wear. It is most important that the motor oiling instructions be carefully followed. The resistor and operating contact, as well as the limit switches, for electric control systems should be inspected frequently because dirty or corroded contacts can appreciably reduce the number of steps available.

The ambient temperature at an electrically operated valve should never exceed that specified for that type of electrical equipment. The valve and motor should be installed with the recommended linkage arrangement so that the partial characterization obtained by such means is the most favorable, especially in the case of fuel-air ratio valves.

The influence of outside variables often produce such large upsets that a single controller will fail to maintain process balance. Such outside variables should be corrected at the source.

An upset in the process must carry through the process and finally reach the controller before any correction can be made. The elapsed time between the upset and a complete correction is often very long and serious deviation of temperature may result.

If a controller is applied to measure a variable associated with the upset and its effect corrected before it can reach the process, the job of the main controller is greatly reduced and better control will result.

The case in point is the control of temperature of a gas fired furnace. Pressure changes of a very rapid nature often exist in fuel gas lines. When using a controller directly operating a valve these pressure changes cause a change in flow of the fuel which, in turn, upsets the control of temperature. The controller then has a difficult time trying to hold the temperature within limits.

Suppose a flow controller is installed in the gas line and the temperature controller is used to adjust the control point of the flow controller. This arrangement is commonly called metered control. Now, if a pressure change in the gas line occurs, the flow controller detects the change in flow and makes a correction immediately without allowing the change to upset the temperature. The temperature controller has a much simpler job to perform and the quality of control is improved.

When possible upsets of this nature should be corrected at the source by adding a controller at the proper point. The additional controller need not be a recording controller. Sometimes a pressure-balanced valve or a non-indicating controller will serve the purpose. The results will be far better than by adding all sorts of gadgets to the master controller because the master controller cannot detect the upsets until they have already affected the process.

Many times the upsets are in the form of changes in composition of the material being processed or changes in the heating value of a fuel which cannot be readily controlled. It is then even more necessary to correct these upsets at the source.

An example of an uncontrolled upset follows. Pressure in a steel furnace was controlled with a furnace pressure controller and a damper. In the morning wide cycling of furnace pressure was observed. Much difficulty was caused until it was discovered that when the sun hit the building in the morning, the operators opened the shutters in the side of the building to cool the furnace room. The varying wind conditions created varying pressure loss conditions and frequent upsets caused the furnace pressure to continually cycle.

Control of final product is desirable. When impossible, more independent variables must be carefully controlled.

In many cases it is impossible, from the practical standpoint, to control the final product. In this case, more of the independent or outside variables must be carefully controlled so that their effect on the final product can be nullified.

In processes having extremely large capacity and large dead time, hours will sometimes elapse before a change can be completely detected. There is a limit to the lag through which any controller can maintain effective control.

Summarizing, there are many more problems in automatic control than just the controller itself. In any control problem the quality of control can be improved more by carefully analyzing the measurement and the process than by needlessly complicating the control system.

CHEMICAL DEBARKING UNDER INVESTIGATION

CANADIAN Forest Products Laboratory is conducting experiments to evaluate the effect of treating trees with various chemicals so that the bark may be more easily peeled from the felled trees to be used by pulp mills. It has been positively shown that it is possible to introduce chemicals into the ascending sap stream of trees, which permit the ready peeling of the treated trees, even though felled long after the normal seasons for "natural" or "sap" peeling is over. The development of a completely satisfactory method would enable the operating season in the woods to be extended, and permit the utilization of sawmill slabs as pulpwood—which is impractical at present because of the closely adhering bark.

The method of treatment consists in removing a strip of bark from the circumference of the tree and applying the treating chemical to the exposed sap wood and thereby to the sap stream. Among the chemicals tested to date are: sodium arsenite, sodium bisulfate, sodium pentachlorophenate, and ammonium sulfamate.

As yet, although results have been encouraging, an entirely effective and economical method has not been realized, but laboratory investigations are continuing in this field.

TECHNICAL SERVICE
Link Between Research and Sales

by LAWRENCE H. FLETT, Director, New Products Division
National Aniline Division, Allied Chemical & Dye Corp., New York

IN RECENT years a greatly increased emphasis has been placed on the use of technically trained employees to expand the use of chemicals. Technical divisions to assist in marketing have been established under a variety of names by most of the large companies in the chemical industry. The term "Technical Service" has been commonly used to designate such groups.

It has been said that half of research is knowing what is wanted. The function of finding out what is wanted is the responsibility of "Technical Service." Let us examine what it means.

Research chemists always seem to be making new products, and the research groups of every large industrial concern develop annually a parade of new and improved products, many of which are rejected by their sales organization because there is no apparent outlet for them. Prodigious sums of money can be invested in products which are never manufactured. There have been several famous examples of this in the history of the American chemical industry. The purpose of industrial research is to develop products which will be sold at a profit; products which a company develops and does not manufacture are of no more commercial interest than any one of the multitude of chemical compounds listed in the chemical literature.

Know What Is Wanted

It is the responsibility of the technical service group to know what is wanted. Therefore it is to be properly charged with a large part of the responsibility for the results of the company's research program, regardless of the comparative size of the group. The technical service man who finds it possible either to stop the development of worthless products or to find an outlet for a new product which has been developed but which would be rejected without his efforts, is truly fulfilling the responsibility for his share of the research program. If a technical service man were capable of directing all of the activities of his company's research department into profitable channels, he would indeed be priceless.

The Research Department of a large industrial company is not a simple organization. It is an organization which has many functions, functions which require men of different temperaments and of different capacities. Research may be broken down into the following basic categories: (1) improvement of existing products and processes, (2) the development of new uses for existing products, and (3) the development of new products. Successful companies budget their research in such a way as to make sure that each one of these different types of research is adequately covered. The technical service man has a responsibility with respect to each.

Improvement of Existing Products: The technical service man has contacts with the Sales Department and with the trade and he is the one who should be able to advise his Research Department as to what products should be improved. Without the advice of the technical service organization and without sales contacts with the customer, it is difficult for research to determine which products could be improved to the greatest advantage, or even to determine what constitutes improvement. Generally speaking, higher purity and lighter color represent improvement. However, strangely enough, there are many cases where an impure product is preferred because it gives more desirable results than does the pure product.

Development of New Uses for Existing Products: Technical Service Divisions must constantly seek new uses for the chemicals which their companies manufacture. There may be among the present products of some company a material which would make synthetic rubber better than natural rubber, or there may be hidden the answer to a rustless iron.

The appraisal of competitive products is of primary interest to the Technical Service Division. Regardless of whether Technical Service Divisions carry on their own evaluation of competitive products or not, they should make certain that such data is available to them. They should be alert to recognize new developments, and conversely they must not be too quickly swayed by optimistic data concerning every new product which comes on the market.

Development of New Products: The primary interest of the Technical Service Division is in the development of new industrial chemicals and new outlets for chemicals. It is in such work that the technical service man requires his scientific training. How does a company develop new products? Research chemists are always making new products. The Sales Department is always demanding new products. How is the technical service man to bridge that gap between what research chemists wish to make and what sales wants to sell?

The number of chemicals which could be made is infinite. The shelves of the chemical libraries are full of long sets of volumes which do nothing but index known organic compounds. No man or group of men has ever seen all of these compounds, or even knows about all of them. With modern developments in engineering, it is possible to make substantially every product which can be found in the indexes. There may be listed in these indexes at the present time a sure cure for cancer, a perfect antioxidant, a product which would make a plastic as hard as steel, or an ingredient for a coating material which would last forever. If a new product is to be developed, no matter how ingenious the structure, no matter how clever the process by which it is manufactured, it is of no more value than the legion of products already indexed unless it has some use. In fact, the requirements for its commercialization go still further. It must be a product which can be manufactured and sold at a price which will not prohibit its use, and unless it is a most unusual product it must be one which can be manufactured by means within a technology of the concern which is to make it. It is preferably one which could be sold through sales outlets already available.

Know Potential Market

New products developed by a Research Department are generally products based on a company's present manufacturing

operations. Thus, for example, before going into the manufacture of maleic anhydride a study is made of the host of interesting chemicals which can be prepared from the material. If the research were carried out without adequate consideration as to the sales outlet, the Sales Department would suddenly be confronted with a new product of interesting structure but unknown sales potential. If they should reject the product because an adequate market for it is not apparent, the money spent on the research is lost. If the technical service group is to make possible the marketing of a new product, it cannot work as a court favorite, but it can succeed only by the ingenious realization of the possible outlets for the new material. Its work should start back before the new product is developed so that the research work may be directed to chemicals for which some conceivable use exists, and the work must continue in the study of the industrial uses of the product after it has been successfully made.

When the technical service man undertakes the development of sales for a new chemical, the physical properties such as the melting point and the chemical analysis are often only of passing interest. He is much more interested in surface tension, solubility in water and other solvents, stability, reducibility and other factors which are rarely given in the preliminary presentation.

A product which has interesting properties is useful; it does not matter too much what these properties are. It does not matter whether a surface active agent is a wetting agent or a water repellent. It does not matter whether a chemical is an oxidizing agent or a reducing agent; if it causes some effect it has a potential use. The ingenuity which is required of the technical service man in the development of such uses is no less than the ingenuity required in most scientific research work, or in any other department in the business.

The Technical Service Division should be quick to catch the enthusiasm of the Research Department. There are among the rejected products of every large corporation items which have been subsequently developed by other companies and found to be very valuable. Many fine research projects are stopped when they are just short of success. A research worker thrives on optimism, and when he meets unnecessary opposition he often feels frustrated, with the result that he has little interest in carrying his work to successful completion. In industrial research it is often that last touch by the research worker which is the difference between success and failure. The technical service representative must make certain that he is not responsible for stopping research work just short of success. If he does he has rendered worthless the money spent in research, and his company has suffered still greater loss because a profitable item was not added to the line.

Opens Door to Sales

Generally speaking, if the new product which has been developed is one of an entirely new type, it must be introduced to the customer through the customer's research laboratory. So the technical service man, after having figured out some possible uses for his new product, tucks it under his arm and visits the potential customer's research laboratories in order to discuss their possible interest in the product. He is generally welcomed with open arms because chemists are as interested in a new chemical tool as a machinist is in a new mechanical tool. If, as a result of the contact, he receives the information that the product is no good, further development of the product with that company is out of the question and both companies have suffered some loss. If, on the other hand, he receives the information that the product looks interesting, but that the color is too dark or that the foaming properties are only 80 per cent of what they should be, he is then in a position to advise the Research Department concerning the trade wishes. If the contact is finally successful, the manufacture of the new product is started.

The first commercial batch may be a poor one from the standpoint of product quality. Unexpected happenings are the rule rather than the exception. It seems to be impossible to clean completely industrial equipment, and the first batch always carries with it the dirt. By this time, the Research Department has invested a great deal of money in the first production and is extremely anxious that it be accepted. The technical service man, if he sponsors the new product, is confronted with the necessity of trying to develop sales for an inferior material. While the middle road attitude is recommended in such situations, there is no doubt that the development of some of the newest and most interesting products has been seriously delayed because of the poor quality of the initial production.

Finally the work of the technical service man is completed; the manufacture of a quality product is established and the product is being consumed at an increasingly satisfactory rate which assures the success of the product. When the technical service man surveys his accomplishments he will see that he has rendered a service to the cooperating consumer who benefits from the use of the new product. The technical service man's company has benefited through increased sales possibilities and the chemical industry has benefited through the expanding manufacture and use of new chiemcals.

Every large chemical concern has profited from contact with technical service men of other organizations. They look to these technical service men to keep them advised of new developments and to solve the technical problems they have with purchased materials. Some concerns are so conscious of benefits resulting from visits by technical service men that they have sent missionaries around to make certain they are included in the itineraries of technical service organizations of other companies.

Many technical service men in the chemical industry have come to know technical service men of other companies. Valuable advances in the field of industrial chemistry have resulted from contacts between these individuals. Technical service men who prove helpful and dependable will find that most concerns have "welcome" on the mat.

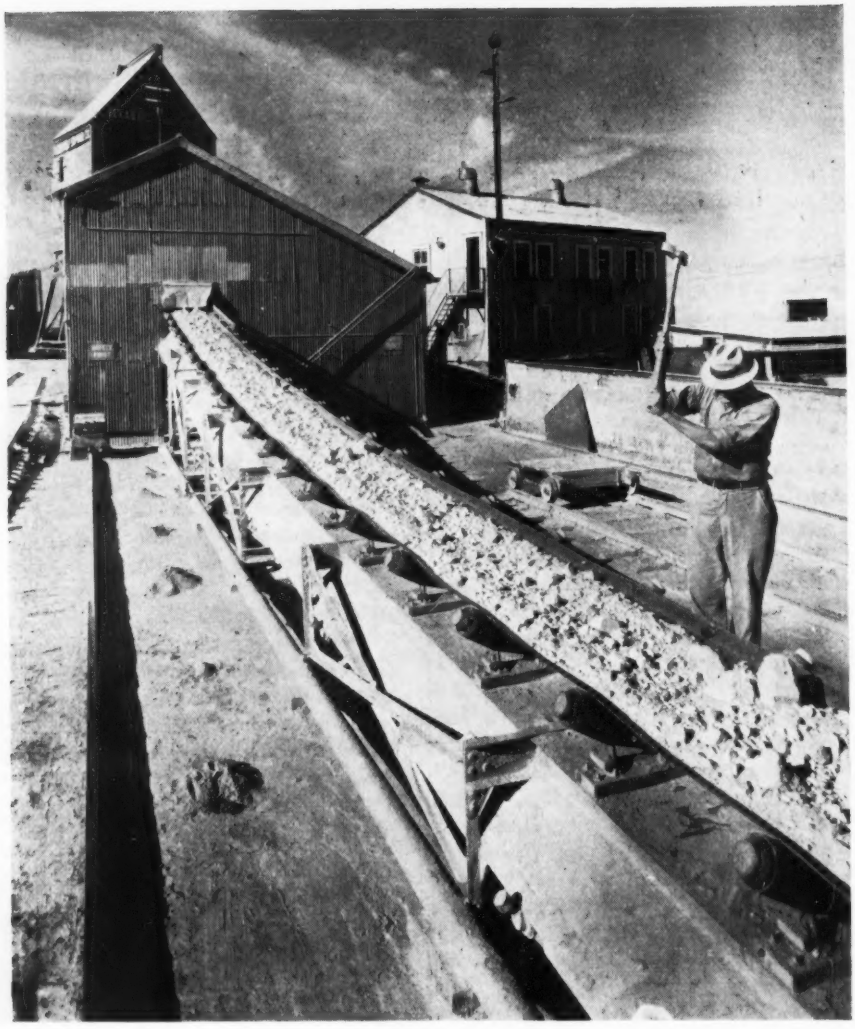
WOOD TREATMENT BY CHEMICALS IN SAP STREAM

OF INTEREST to makers of wood treating chemicals is a method developed by the U. S. Department of Agriculture by which farmers and other users of wood-lot trees can introduce chemicals into the sap stream of the wood to increase the length of service of fence posts, bean poles, garden stakes, and other utility poles.

The method is said to be particularly adaptable to use by amateurs because it is neither difficult nor expensive. The fresh-cut saplings are simply allowed to stand in a wooden tub or trough containing the right amount of chemical in solution for a period of about six hours or until they have taken up the required amount of chemical. Tops of the saplings are supported by leaning them against a tree or building.

Chemicals recommended include chromated zinc chloride, zinc chloride, and copper sulfate (bluestone), of which the chromated zinc chloride is indicated as the best. One pound of any of the chemicals dissolved in a half gallon of water will treat one cubic foot of wood, or the equivalent of a sapling which measures about four inches at the base and is about 30 feet tall.

The method of introducing chemicals into trees and poles through the sap stream has been known for years, but until recently it has not been practicable for use by farmers. The new technique is the result of ten years' investigations, from 1930 to 1940, in North Carolina and South Carolina by the Bureau of Entomology and Plant Quarantine, in cooperation with the Appalachian Forest Experiment Station, U. S. Forest Service. The investigations are continuing in the hope of improving the method and finding better chemicals for wood preservation.



Loading sulphur at Galveston, Texas

Common Forms of Sulphur in the World Markets

by W. W. DUECKER
Texas Gulf Sulphur Company, Inc., New York, N. Y.

ONE OF THE MOST IMPORTANT BASIC HEAVY CHEMICALS, sulphur has come down through the ages in many forms and grades for many uses. Today's commercial varieties, of which crude "run of mine" is most common, are the result of long development to meet specific industrial requirements.

THE FORM in which various commercial products appear on the markets of the world is often determined by custom and tradition. This seems to be particularly true of those produced by the mining industry, where many of the products are recovered from ores by smelting operations and are obtained in the molten state. It is simple and convenient to cast the melt in a mold and to allow it to solidify. Since earliest days, therefore, these products of the mines have appeared on the market in the standardized and conventionalized form of ingots, which, according to custom, have been given special names. Accordingly, one may buy bars of gold and silver, billets or cakes of copper, blocks of tin, slabs of zinc or antimony, and pigs of iron, lead or manganese.

Sulphur, too, is recovered from its ores in the molten state. It also may be produced in the form of ingots and before the development of the American sulphur industry, it, too, appeared on the market in this form. The founders of the American sulphur industry, however, in preparing their product for market, departed from tradition. Instead of casting their sulphur in the conventional form of ingots, pigs, or cakes, they produced it in an entirely different form, a form seemingly well adapted to the needs of the sulphur consuming industry, a form which has become the standard of the world.

Sulphur in Sicily and Italy

Prior to 1900, practically all sulphur consumed in the United States came from Sicily. Sulphur in that country is found in underground deposits and is mined by conventional methods. The ore is heated in various contrivances and the molten sulphur which separates from the gangue is collected and in accordance with standard mining practice is ladled into molds and allowed to solidify. The blocks or cakes of sulphur so produced contain approximately one cubic foot of sulphur and weigh about 120 pounds. This is the traditional form in which sulphur originally appeared on the markets of the world.

Today, as in previous centuries, the sulphur produced in Sicily and Italy is still cast in similar molds. There are obvious reasons for this practice. The blocks of sulphur are conveniently handled by the hand labor employed. They are easily transported over mountain trails on the backs of donkeys. At seaports the blocks can be carried by men through the water to the lighters. They constitute a self-contained packaged unit through use of which handling losses are reduced. Furthermore, sulphur in this form may conveniently be separated into various grades when the quality of the sulphur produced by the methods employed varies. The blocks can be easily classified by inspection and originally were separated into six grades, varying in color from a canary yellow to a dark brown. Since 1940, however, the number of grades of sulphur in the Italian trade has been reduced to four known as: best seconds, best thirds, good thirds and current thirds, and range in sulphur content from 99.5% down to 96.0%.

At one time these blocks were a standard item of international trade. Today, it is difficult to find an American consumer who remembers using them, and our best efforts have uncovered only a rumor of a stevedore in Baltimore who is supposed to remember using slings to

unload a shipment. It also is reported that they were used fifty years ago by a sulphur refinery in New Jersey. Undoubtedly these blocks appeared in the American trade up to the year 1900. But since that time and since "crude run of mine" American sulphur has appeared on the market in a form more convenient for the consumer, these blocks of sulphur are seldom seen. The Italian and Sicilian sulphur of today is still produced in ingot form. On the international market, however, they appear in broken form to approximate in appearance "crude run of mine" sulphur.

Sulphur in Japan

In Japan, however, sulphur is still sold in the form of blocks because hand labor is cheap and production methods are somewhat similar to those employed in Sicily. The sulphur is recovered from ores of volcanic origin. These are heated in cast iron retorts and the sulphur is distilled, condensed to a liquid, and ladled into cylindrical split molds made of light sheet iron. Sulphur of good quality, being 99 to 99.8% pure, is thus obtained in the form of a cylindrical bar which is approximately a foot in diameter and one and one-half feet long. These bars contain slightly more than a cubic foot of sulphur and weigh from 130 to 150 pounds. Fifteen to seventeen of them make one long ton, and prior to shipment the cylinders are usually wrapped in paper and then covered with a rush or straw matting, which is held in place with a straw rope.

A poorer grade of sulphur known as "crater sulphur" is also available on the Japanese market. This is obtained at some mines from fumaroles by condensing the escaping sulphur vapors in pipes, brick chambers or tunnels.

Sulphur in Java

Domestic sulphur in Java appears on the local markets in several distinctive forms and packages. In that country sulphur is found in the craters of extinct volcanoes contaminated with volcanic ash as a mud from which it is recovered by conventional flotation processes. It is flocculated, allowed to settle, and the wet slurry is dried on shallow trays by exposure to the sun or in a tunnel or rotary drier. The dried residue so recovered looks like fine dry mud and contains from 93% to 98% sulphur. This fine dusty material is usually packed in hand-woven fibre bags. Although this form of sulphur is suitable for use in the protection of crops, it does not always lend itself to all commercial uses. Traces of oil in the product interfere with its burning qualities. A better product is therefore prepared by treating the sulphur bearing mud with steam in vertical lead-lined autoclaves. Successive heat treatments cause the minute particles of sulphur to increase in size so that they can be separated from the pumice by gravity. The product, 98.5% to 99% pure, is then melted and cast in the form of bricks weighing about 2 pounds, and this is the form in which the bulk of the product in Java is now sold.

Sulphur in South America

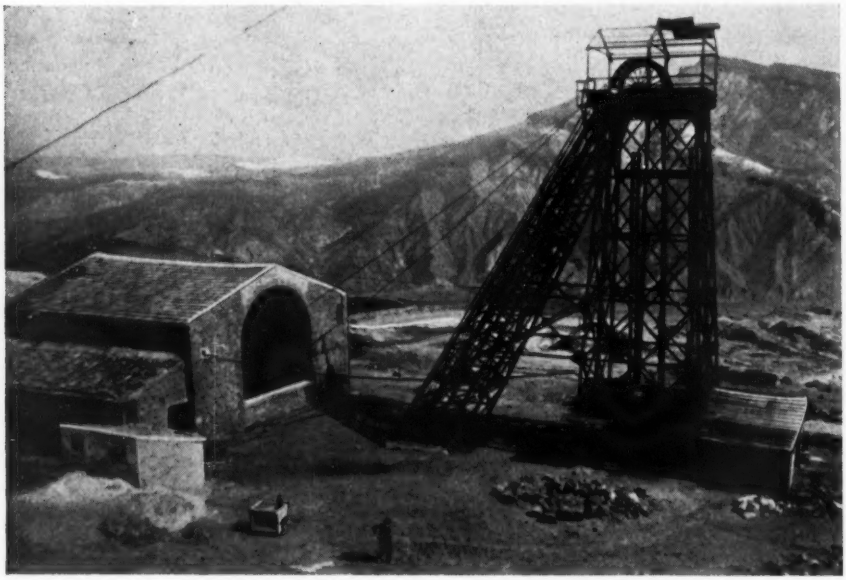
Although sulphur is produced in some of the South American countries, in most of them "crude run of mine" sulphur seems to have been adopted as the standard of trade. Here sulphur is found in surface deposits on both the western and eastern slopes of the Andes. Sometimes the crude ore which contains from 30% to 90% sulphur is used as such without refining. Usually, however, the ore is collected by conventional methods and heated in autoclaves, and the molten sulphur obtained is cast into molds. The sulphur, 99.5% pure, is then broken and packed in bags for shipment. Brazil and Argentina import some of their sulphur requirements from Chile, but the major portion of the product used in Latin American countries is currently obtained from the United States and for domestic use is usually repacked in burlap bags.

Development of the American Form

Thus it is apparent that in Java, Japan, Sicily and Italy sulphur miners conform to tradition and market most of their product in the form of ingots. Since sulphur had been mined for centuries in Sicily and Japan, and since the Italian

In Java, sulphur is found in the craters of extinct volcanoes. Contaminated with volcanic ash, it is recovered by flotation processes.

Gill furnaces for extracting sulphur from ores in Italy. The molten sulphur which separates from the gangue is collected and ladled into rectangular molds where it solidifies



Head frame of Italian sulphur mine. Prior to 1900, practically all sulphur consumed in the United States came from Italy and Sicily, where it is found in underground deposits.

Construction of calcarone for extracting sulphur. After mining by conventional methods, the sulphur ore is heated in various contrivances and the molten sulphur separates out.

product was known the world over, it might have been expected that the American producers of sulphur would have been influenced by precedent and also cast their product in a conventional mold when they began the production of this element. But Herman Frasch, the founder of the American sulphur industry, was not a miner. He had been trained in the oil industry. Therefore, when his first well went into production he collected the first sulphur he produced in a barrel. When larger production was obtained he resorted to another device used by the oil industry and collected the sulphur in shallow vats. He did the simple and expedient thing. And, when he "broke down" the vats and offered the broken sulphur to the trade, he introduced to the world sulphur in a new form, a form convenient to the consumer, a form which has become the standard of the sulphur-consuming industry.

American Vat Sulphur

American sulphur in a sense is cast in a mold. The mold, however, consists of a shallow bin which may be 1,000 or more feet long and perhaps 200 feet wide, with side walls made of sheet metal. A thin layer of molten sulphur is distributed over the area of the bin and allowed to solidify. Successively, other layers of sulphur are added, cooled and solidified. The metal side walls are raised gradually and finally there is formed a huge solid block of sulphur called a vat which may be 50 feet high and contain half a million tons of sulphur.

When required the vat is broken down for shipment. This is done by drilling holes at suitable intervals, back from the face of the vat. Explosives are charged to each hole and detonated. The resulting blast removes a vertical block of sulphur from 12 to 20 feet thick, breaks it into sizes suitable for loading and deposits at the foot of the vat sulphur in a form recognized the world over as "crude run of mine" American sulphur.

"Crude run of mine" sulphur as mined by the Frasch hot-water process is 99.5% to 99.9% pure. It is free from arsenic, selenium and tellurium. It may contain small quantities of ash, moisture and sulphuric acid, and since the sulphur domes are found in localities where oil is produced, "crude run of mine" sulphur may also contain small quantities of oil or bituminous material similar to that found in Italian sulphur.

"Crude run of mine" sulphur, a nonmetallic element, a bright yellow, brittle, dry, granular, free-flowing material, is a more convenient article to handle than is sulphur cast in cakes, blocks or bars. The material blasted from the face of the vat may contain lumps eight inches in diameter, but at least half of it is small enough to pass through a half-inch sieve. During transit to destination many of the larger lumps are broken. On ar-

rival, therefore, at the consumers plant the material is generally in such form that it can be handled easily and conveniently with grab buckets, chutes, mechanical conveyors, or shovel and wheelbarrow.

Sulphur in this form is shipped to all parts of the world. Shipments are usually made in bulk in carload, barge load or shipload quantities. Standard carloads may contain 50 tons, barge loads from 200 to 2,000 tons, while the largest shipload on record approximated 12,000 tons. Some "crude run of mine" sulphur is also shipped in bags.

Modified Forms of Sulphur

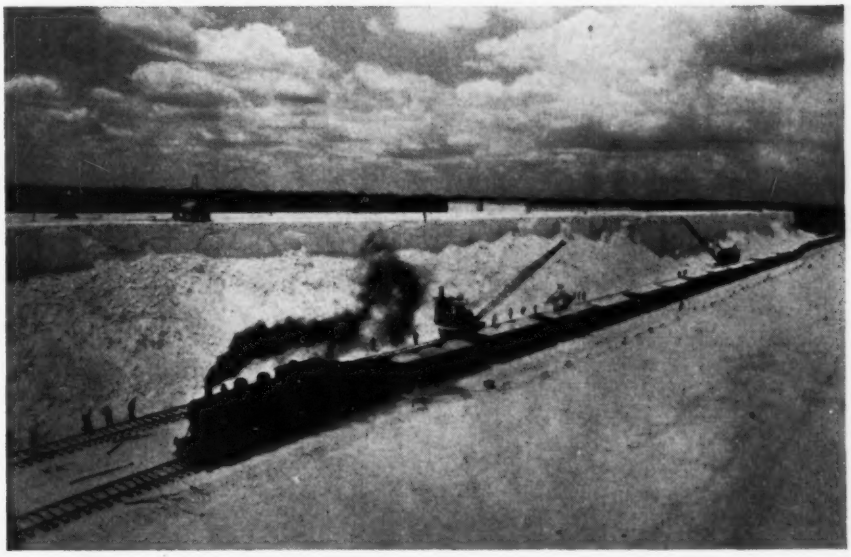
Although the American "crude run of mine" sulphur is now a standard in world trade, the producers have been active in their attempts to find other marketable forms which would solve certain difficulties for them and also for the receivers. From the producer's standpoint, the large vats result in a certain amount of wastage due to the sinking of the great weight into the soft earth. Blasting also is necessary which requires labor experienced in the handling of explosives. To eliminate the huge vats, thought has been given to the shipment of liquid sulphur in tank cars, but the problem of freezing while enroute has been an insurmountable difficulty up to the present. Efforts have been made to cast the sulphur on a revolving wheel to produce slabs or bars which would be of the proper size for easy handling by shovel, conveyors, etc. The stock piling of such slabs at the mines presents a difficulty in that when loose sulphur is piled in the open, it oxidizes under the influence of the sun and rain to form minute quantities of sulphuric acid which is detrimental to some processes, whereas if the sulphur is stored in vats in the form of a large monolithic block which sheds water, acid formation is held to a minimum.

In Norway and later in Canada where sulphur is produced as a by-product in smelting operations, attempts were made to cast the sulphur into pellets by the "shot tower" method. This could be practiced at the American mines, but stock piling in a hot, humid climate again presents some difficulties; and furthermore, the pellets are as slippery and hard to hold as the well known flax seed. Shipping such a product in bulk in anything but water-tight equipment presents a real problem, and the advantage to either the producer or the receiver disappears. The production of such pellets has been discontinued in Canada and only part of the sulphur produced in Norway was marketed in this form.

Processed Forms of Crude Sulphur

Because much of the Sicilian sulphur was impure, judged by the standard set by the American product, it was custom-

American sulphur, mined by the Frasch hot water method, is distributed in successive layers over the surface of a large vat, several thousand sq. ft. in area, to solidify.



Trainload of sulphur at Newgulf, Texas. In the background is a solidified vat of sulphur that is being broken up for shipment. Sulphur in this form is called "crude run of mine."

Retorts used in a Japanese sulphur refinery. The sulphur is recovered from ores of volcanic origin. These are heated in the cast iron retorts and the sulphur is condensed.

ary to refine the Sicilian product by distillation or sublimation to produce an essentially chemically pure product. The process of subliming sulphur is comparatively simple. Sulphur is charged to cast iron retorts. These are heated and the sulphur vapors led into large chambers where the sulphur is condensed. The temperature at which the sulphur condenses determines the type of product obtained. That which is collected in liquid form and cast in cylindrical molds about 2 inches in diameter is known as roll, stick or cannon sulphur. In some instances it is cast in truncated cones of perhaps two inches at one end and four inches in diameter at the base.

The molten sulphur may also be allowed to solidify in barrels or in other larger molds. That which is allowed to solidify in barrels and sold in this form is known as "virgin rock brimstone." The product broken into lumps, one to six inches in diameter, and packed in bags holding 200 pounds or in barrels holding 500 pounds, is known as "broken rock brimstone." These sublimed products are used for fumigating, preserving, curing and bleaching where the burning of sulphur is intermittent or on a very minor scale.

If the temperature of the condensing chamber is properly adjusted, part of the sulphur vapors condense in the form of a very fine floc. This kind of sulphur is known as "flowers of sulphur" or "sublimed flowers." This "flowers of sulphur" which weighs about 30 pounds per cubic foot, is so fine that more than 90% of it will pass through a 100-mesh sieve. Consequently it was used for generations as an insecticide and fungicide in the vineyards of France and Italy to protect the grape crop. With the development of grape growing on our West Coast, it was only natural that its use should also spread to this area. "Flowers of Sulphur" is also said to possess other virtues. It contains from 25% to 30% of amorphous sulphur. Special uses have been found for this material and amorphous sulphur made by extracting "flowers of sulphur" is now available for the rubber industry.

"Crude run of mine" American sulphur has a purity which approaches that of distilled sulphur, and over the years it was recognized that if this could be ground it would be a competitor of "flowers of sulphur" for many uses. Manufacturers did this very thing by grinding it in an inert atmosphere. Such ground sulphur produced in any desired degree of fineness is known in the trade as "sulphur flour" or commercial ground sulphur.

"Sulphur flour" appears on the market in a comparatively wide range of fineness for specific uses. That which is used for dusting vineyards and orchards is now reduced to pass through a 325-mesh sieve. One common use for such sulphur is as a cattle dip. Since finely ground sulphur packs and lumps, making it unsatisfactory for use in dusting machines, certain inert materials are added to make it free flowing and to eliminate this lumping or caking property.

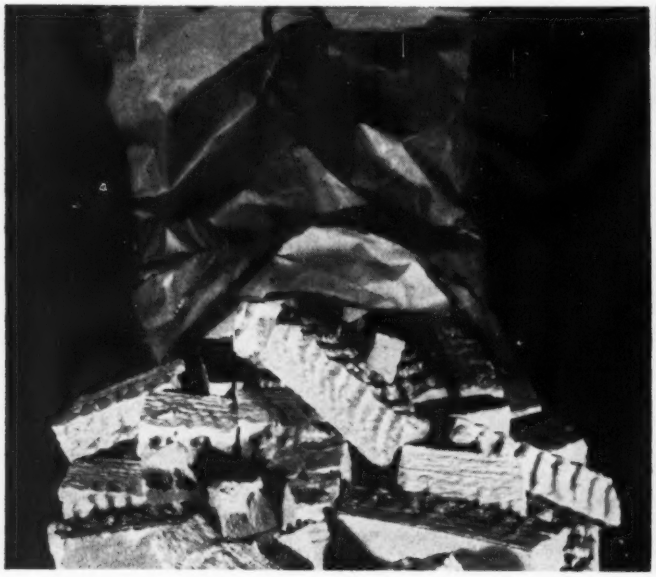
Other Forms of Sulphur

Besides those which have been described, sulphur may also be obtained in certain other forms. Some of these, however, such as "precipitated sulphur," "lac sulphur," etc., are of minor commercial significance. "Precipitated sulphur," washed to remove all calcium chloride and used in pharmacy, is obtained as a finely divided product on adding hydrochloric acid to polysulfide solutions. "Lac sulphur" is finely divided sulphur obtained when sulphuric acid is added to polysulfide solutions. It contains up to 45% calcium sulfate. Colloidal sulphur is the name given to a variety of products in which the sulphur particles are so small that they remain suspended in water.

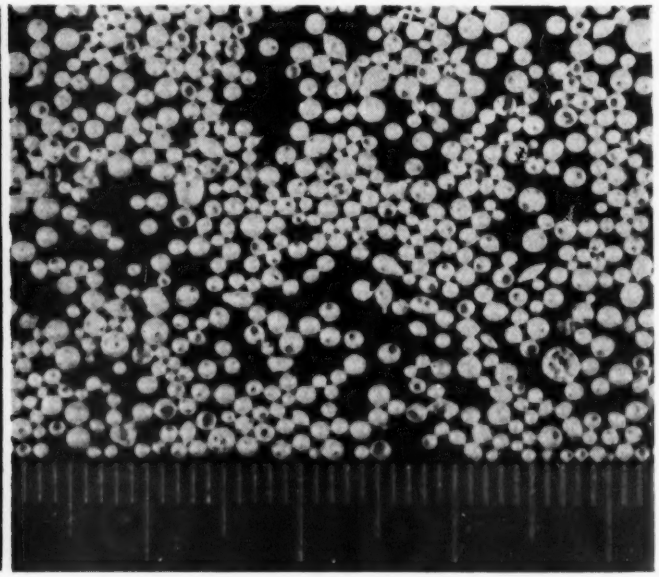
A product known as "gas house sulphur" or "flotation sulphur," however, has commercial significance. This kind of sulphur is obtained as a by-product on cleaning coke oven gas. It is collected as a froth or foam and is offered to the trade in the dried form or as a wet paste. "Flotation sulphur" is made up of very minute particles of sulphur and the product has therefore been used as an insecticide or fungicide. It generally is contaminated with certain materials used in the gas purification process. Because of the limited demand for insecticidal and fungicidal sulphur, at some gas cleaning plants this type of sulphur is melted, cast and sold in competition with "crude run of mine" sulphur.

The Standard Form of Sulphur

Centuries of tradition and custom have played a big part in determining the form in which sulphur appears on the markets of the world. This is not surprising for sulphur was undoubtedly one of the first elements to be obtained from the mines in pure form. It has been known and used since remote antiquity. It has always been prized as a valuable article of commerce from the days when it was used in religious ceremonies and by the alchemists to the present when the quantity of it consumed is sometimes used as an index of our civilization. Its long and venerable industrial history is reflected in the names applied to certain forms of it, such as brimstone, flowers of sulphur, virgin rock brimstone. But the form recognized today as the standard of the trade is known as "crude run of mine" American sulphur. It is a form of sulphur suited to the needs of the modern sulphur consuming industry.



Sulphur is cast on a revolving wheel to produce slabs or bars of the proper size for easy handling by shovel or conveyor.



Pellet sulphur (above scale 1 div. equals 1 mm.) is made by the shot tower method. It is not produced in this country.

A Case for State Licensing of Chemical Engineers

by JOHN M. WEISS, Consulting Chemical Engineer, New York, N. Y.

UNLESS A SHARP LINE OF DISTINCTION can be drawn between the true professional man and the technician, the rising tide of unionism may engulf professional groups as well as sub-professionals. In the case of chemical engineers, Mr. Weiss believes that the state licensing laws provide a means for such distinction.

This article is a condensation of a communication to the council of the American Institute of Chemical Engineers by Mr. Weiss, who is chairman of the Institute's committee on legislation. It is presented here because of its general interest to the chemical industry.—EDITORS.

THE impact of labor union movements on engineers has in some cases been severe. There has even been one case where an engineering consultant was unable to serve the plant of a client without first acquiring membership in the union dealing with that plant. If chemical engineers are to maintain a professional rather than a trade status, they must take their heads out of the sand and indulge in positive action.

Such action should be based on the same type of analysis and consideration as is used in atacking any ordinary engineering problem. The objective must be visualized and the steps to the objective charted. The first step is to establish a distinction, based on law, between the technician, who essentially works with his hands, and the professional engineer, who works with his brain.

Probably the case of the technician, who is satisfied with his niche and has abandoned (if he ever had it) all idea of going further, is best handled by trade union methods. But unless we can make a sharp line of distinction between true professionals and technicians, the tide is going to engulf professional activities as well. If we have a closed shop including the technician, a considerable part of the engineers on the lower rungs of the ladder, and the mass of young pre-professional engineers, it will be hard to prevent the extension of union membership upward to include all engineers, unless some real distinction is set. Chemical engineers have no right to expect that they will be any exception. If an outside consultant can be forced to become a union member or forego any engagements with organizations having a technical closed shop, the situation requires more than academic consideration.

Legal Distinction Needed

The tagging and definition of the professional cannot be left to individual opinion, nor to the joint opinion of self constituted organizations such as our national engineering societies and their membership requirements. Legal recognition is required. The strength of the legal profession, the medical profession, and the architects is based on such legal recognition afforded by the laws of our several states.

For the engineers, the mechanism also exists in the engineering registration acts which are almost universal today in the United States. These have been enacted against the protests and apathy of a considerable proportion of the engineering profession and have, in many cases, been emasculated by making their application permissive rather than compulsory. Imperfect as they are, they do form the basis for immediate steps against the tendency to place the profession on a trade basis and if steps are not taken soon, it may be too late.

Such acts allow the mature engineer, in general after five years post graduate practical experience, to license as a professional engineer and place a seal of legal right on his professional status. Very recently several states have amended their laws so as to qualify the young graduate as "engineer in training" immediately after graduation and thus bridge the gap until full professional status is attained. This category is under consideration in a number of states and may shortly be expected to be general practice, especially if engineers as a whole put their influence and effort behind it.

The chemical engineer must take active part if his interests are to be protected. It is not a question of being opposed to licensing, as so many of our older confreres have been. We are dealing with a condition and not a theory. Licensing is here to stay and will grow with the years. It is our answer to the question of legally establishing professional status and we should take advantage of it.

Start at the Top

The first requisite is to have as large a proportion as possibe of chemical engineers licensed. The effort should be first at the top of the profession so that by example the others can be persuaded. Men in executive positions whose past work has been in engineering, should be included as well. A doctor or lawyer who gives up active professional work in order to manage a business of his own can and usually does retain the legal right to practice his profession, and chemical engineers should do likewise.

Certain unions have been established which have as their purpose the organization of the chemists, architects, engineers and technicians employed by our large corporations. There have, however, been no attempts to include the plant doctor or the corporation lawyer, although these may also be full time employees of the corporation. In too many cases the basic cause of the existence of such unions has been the attitude of certain managements, who have boasted that they used college graduates during the depression as process operators because they could be obtained more cheaply than regular labor. The practices which are very prevalent in construction engineering organizations in all fields, including those specializing in chemical engineering, in the conditions of employment of draftsmen and junior engineers, are also bad. They are hired and fired often with very much less consideration than would be given to unionized common labor. This is not a universal condition, but it is sufficiently prevalent to constitute a real "sore" spot.

Our first efforts should be to the end that chemical engineers of all degrees register legally as professionals to the degree they are able to do so. In approaching the problem, the attitude should not be one of blind opposition to unions but rather cooperation with the unions to be mutually assured that neither would usurp the prerogatives nor invade the field of the other group. The unions have grown along these lines, partly at least, because of abuses which have existed and which should be remedied, not by the unions but by the professional men themselves. It is quite probable that the unions would welcome such action as removing some questions which must be quite troublesome to them.

Without a line of division however, clearly marked by laws, disputes as to status would inevitably be numerous and dangerous. The licensing laws furnish us a sharp division. Let us use them for the well being of our profession.

Determining the Most Economical Primary Voltage For Medium-Size Chemical Plants

by D. L. BEEMAN
Engineer, Industrial Engineering Division
General Electric Co., Schenectady, N. Y.

WHICH IS THE MORE ECONOMICAL basic distribution voltage for a new, medium-size chemical plant, or an existing plant being reconverted, modernized, or expanded: 2400 or 4160 volts? Contrary to frequently-expressed opinion, the correct answer in most cases is the latter. Here's why.

IN ANSWER to the above question, "Which is the more economical basic distribution voltage for a medium-size plant," many operators will say 2400 volts rather than 4160 volts, the other most frequently available voltage, for an apparently logical reason. A sizable percentage of the total electric power in many industrial plants is consumed by motors ranging from 40 to 500 horsepower. Since motors in that range can be connected directly to 2400-volt circuits, it is commonly believed that the lowest-cost electrical system—including power generation, distribution, and motors and control—can be obtained by distributing purchased or generated power at 2400 volts. A review of the factors which influence system cost indicates that such is not the case.

Advantages of 4,160 Volts

Studies of specific systems show that, so far as over-all electrical system costs are concerned, it is nearly always less expensive to use 4160 volts primary or generation voltage rather than 2400 volts, and to operate most motors of 200 hp. and less on 460- or 575-volt circuits. This conclusion is based on the data shown in Fig. 1. The derivation of these curves is explained in detail later in this article.

The 4160-volt system offers many important advantages other than lower cost. Short-circuit current bottlenecks are not reached as readily, as higher system short-circuit kva. can be tolerated in 4160-volt systems, compared with the 2400-volt systems, before it is necessary to introduce reactors or to resort to special combinations to reduce short-circuit currents. In general, fewer primary feeder positions and less cable are required for the 4160-volt distribution system compared with one using 2400 volts. This reduces the space required for housing the switchgear, and also the space required for conduits for the primary cable.

From the standpoint of safety, it is generally concluded that there is substantially no difference between the commonly used 2400-volt delta system, which normally is not grounded, and the 4160-volt system with the neutral grounded according to modern recommended practice.

To select the most desirable primary or generation voltage would necessitate comparing all voltages below 15 kv. This would be rather involved and is beyond the scope of this article. The main consideration in many medium-size industrial plants is whether to use a 2400- or a 4160-volt primary power system. The remainder of this discussion is limited to an economic comparison of these two voltages.

In some areas 4800 volts is the standard primary voltage. The basic factors presented here are not substantially altered whether the voltage is 4160 or 4800 volts. Since 4160 volts is far more common than 4800 volts, the former will be used as a basis of comparison.

In studying the economics of this problem, certain basic equipment and system elements were considered. These are discussed in the following paragraphs, with an inclusion to show the effect of other types of motors and motor starters than those listed below.

Motors and Motor Starters

Standard squirrel-cage induction motors are by far the most common. Therefore, to make this study as representative as possible, these motors have been considered as a basis of comparison. The curves in Fig. 1 are plotted for 1800-rpm motors.

There has been a tendency to totally disregard short-circuit current interrupting duty imposed on motor starters for short circuits which may occur on the load side of the motor starter. Adequate interrupting capacity is desirable in the motor starters to safely and quickly open these short-circuit currents. When a fault occurs on the load side of the motor starter and the latter does not have adequate interrupting capacity, it may fail and endanger nearby personnel and property. It may also cause the feeder circuit breaker to be tripped out, thus dropping service over a large area of the plant and, as a consequence, substantially affecting production. From this it can be seen that it is just as important to select motor starters with adequate short-circuit interrupting rating as it is to select feeder circuit breakers with adequate interrupting rating. Therefore, only modern combination motor starters are considered in this basic comparison.

System Factors

To use 440- or 550-volt motors in a plant in which the primary or generation voltage is higher than 600 volts requires a transformation to less than 600 volts for these motors. Therefore, when comparing 440-volt motors to motors operating directly at primary voltage (i. e., 2400 or 4160 volts), the installed price of a step-down substation must be included with the 440-volt motors and control. This substation is included at $4.00 per horsepower. This figure is based on the installed price of a unit substation such as shown in Fig. 2, consisting of a transformer and one secondary breaker. It is assumed that, due to diversity, one kva of transformer capacity will care for 1⅔ hp of motors. Since branch circuits to 440-volt motors usually require larger cables than do 2300- or 4000-volt motors, fifty cents per horsepower was included in Curve A to cover the cost of the larger 440-volt cables.

The cost of the low-voltage motors, control, and the step-down unit substation is

plotted as a function of motor horsepower rating in Curve A, Fig. 1.

Motors Operating Directly at Primary Voltage

When selecting the primary voltage of the power distribution system, it is necessary to consider more than just the prices of the motors and control which operate at primary voltage—i. e., at 2400 or 4160 volts.

The cost of the primary system must be considered as well as the cost of the motors and control if the lowest over-all electrical system cost is to be obtained. In factoring the primary system cost, it is assumed that if the power is distributed at 2400 volts, 2300-volt motors will be used; and if the power is distributed at 4160 volts, 4000-volt motors will be used.

In industrial plants with a total demand of a few thousand kva, the primary power system (i. e., the generating plant or main step-down substation from the utility system) and the primary switchgear and cable cost about $2.00 more per kva for 2400-volt primary voltage than for 4160-volt primary voltage. This cost differential will increase to about $4.00 or $5.00 per kva for systems 10,000 kva and larger.

Therefore, if a 2400-volt system is arbitrarily chosen in place of a 4160-volt system, the extra cost of the entire 2400-volt over the entire 4160-volt distribution system, plus the cost of 2300-volt motors and control, must be compared with the cost of 4000-volt motors and control for those motors which operate at primary voltage.

This comparison can be made by referring to Curves C and D in Fig. 1. These curves show that the 2300-volt motors and control, plus the extra cost of the 2400-volt power system, are more expensive than 4000-volt motors and control. For the general case, then, Curves C and D, and not Curves B and C, should be used when selecting the primary system voltage for plants where a sizable portion of the total connected load consists of motors larger than about 200 hp.

The total *extra cost* of the entire 2400-volt power system over a 4000-volt power system has been included at $4.00 per horsepower of high-voltage motor, i. e., $4.00 per horsepower was added to Curve B to obtain Curve D. This figure ($4.00) is arrived at by assuming that complete 2400-volt power systems cost $2.00 more per kva* than 4160-volt power systems, and that an equal kva capacity of power system is required for serving motors operating at primary voltage and to serve all other load which is operated at 600 volts or less. If the high voltage motors require only one-half the system capacity for supplying them, that means that the two kva of more costly 2400-volt system capacity (at $2.00 per kva extra) is required per horsepower of high voltage motor. That is the equivalent of $4.00 per horsepower of 2400-volt motors.

System costs are usually given in dollars per kva but are added in Fig. 1 as dollars per horsepower, on the basis that the kva and horsepower ratings of high-voltage motors are about equal.

460- or 575-Volt Systems Most Economical for Motors Rated 200 HP or Less

By referring to the curves in Fig. 1, it can be seen that below about 175 hp, 440-volt motors enable the least investment in the electric equipment, regardless of the primary system voltage. Hence all motors rated about 200 hp or less should be operated on systems rated 600 volts or less, regardless of the primary voltage selected.

A close examination of the detailed prices will show that at 200 hp the cost of 440-volt motors and starters in step-down substations, Fig. 5, is about equal to the cost of 2300-volt motors and starters, Fig. 6. This is the reason for placing the arbitrary division at 200 hp rather

* This figure has been verified by many system studies made during the past few years. It is beyond the scope of this article to give the derivation of this figure.

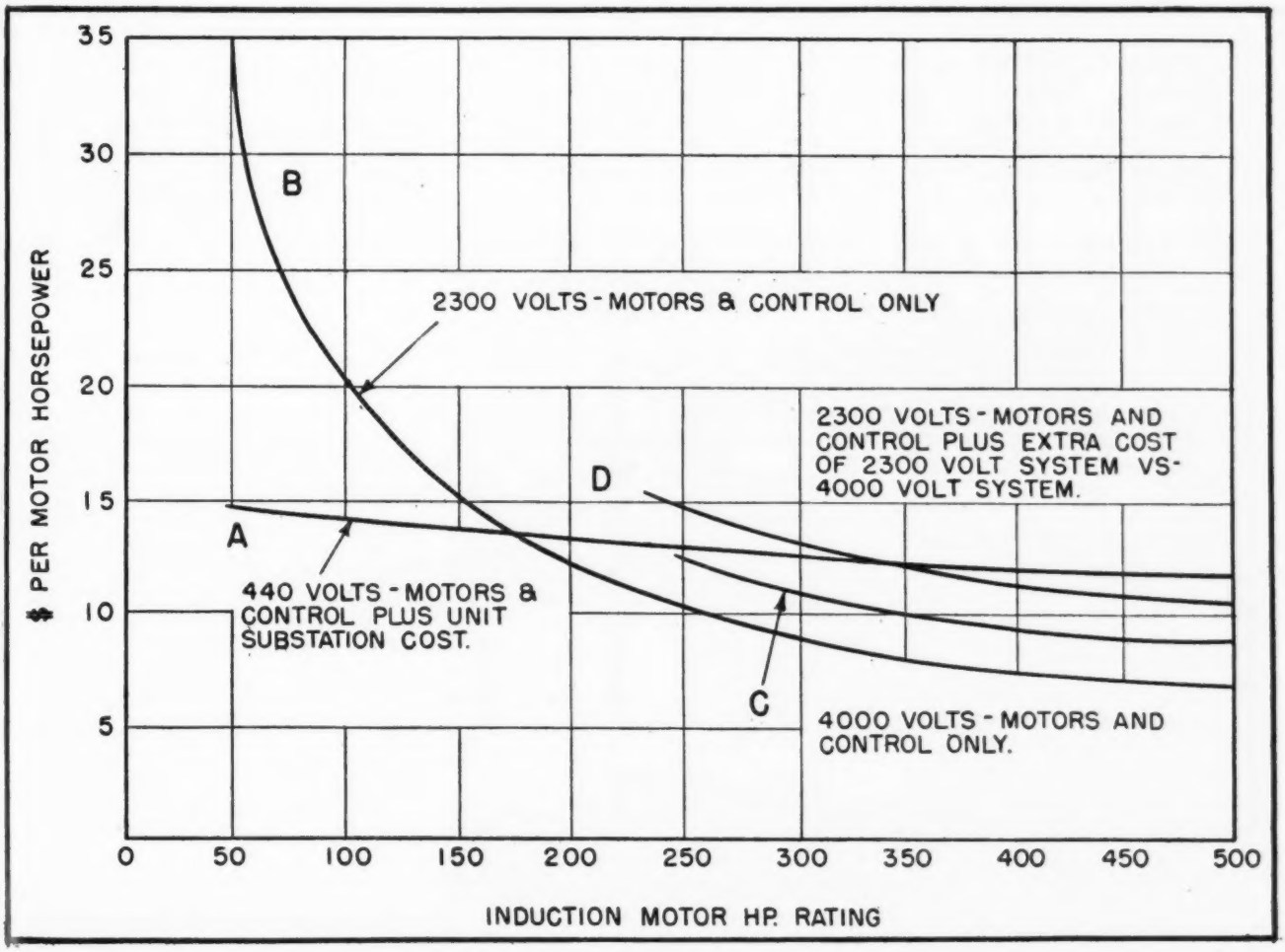


Figure 1

than 175 hp, as pointed out by the curve. These curves represent approximate prices and do not follow detailed variations.

Hence there is no justification for ever arbitrarily selecting 2400 volts as the primary voltage so far as any considerations of motors of 200 hp and below are concerned.

4,160-Volt Primary Systems Usually Give Greatest Over-All Economy

Assuming that there will be a transformation from either 2400 or 4160 volts to supply motors rated 200 hp or less, the choice between these two primary voltages is based on primary system costs and the cost of motors and control for those motors rated above 200 hp. As pointed out previously, and as shown in Curves D and C, Fig. 1, the selection of a 4160-volt system and 4000-volt motors and control (for those motors rated 200 hp) enables a less expensive over-all installation than the selection of a 2400-volt system and 2300-volt motors and control. In areas where the larger motors (i. e., those above 200 hp) constitute more than about 50-60 per cent of the total load, 2400 volts may be less expensive providing the total load of the plant is not more than a few thousand kva.

In general, an equally satisfactory, yet a lower cost power system can be obtained by selecting 4160 volts as the primary voltage for general power distribution, rather than 2400 volts.

Where 2,400 Volts Is Particularly Applicable

In plants which are served at 2400 volts directly from the utility system, then, of course, it would be more economical to use 2400 volts directly and to place all motors rated 200 hp and above directly on the primary feeders. However, in these cases, nearly all motors rated 200 hp and less should be operated on a 460- or a 575-volt system, stepping down from a 2400-volt primary system. In some cases where there are existing 2400-volt systems in industrial plants, it is often more economical to extend these at 2400 volts rather than change to 4160 volts. However, it may be more desirable to extend it at some higher voltage, like 13.8-kv, rather than to extend the system at 2400 volts. This has proven to be the case in many recently made studies of plants which are to be expanded and modernized. A discussion of this is beyond the scope of this article.

Twenty-four hundred volts is particularly applicable to concentrated loads which supply motors rated 200 hp and above, and where the primary voltage is above 5 kv. In these cases, it is preferable to step down from the higher voltage to 2400 volts rather than 4160 volts if the capacity per 2400-volt bus is limited to a few thousand kva, and nearly all of this load is utilized at this bus directly by motors rated above 200 hp.

A typical application where 2400 volts would be most economical is a pumping station in which the control may be of the fused contactor type or of the vertical-lift power circuit breaker type where the vertical-lift feature is desirable and where the frequency of starting is not too great. If this preference is followed, it will be necessary to make a transformation for these large motors. The cost of the transformation is substantially the same whether it is made to 2400 volts or to 4160 volts. Hence the power system cost is not a significant factor, since all of the load is concentrated in one place. The 2300-volt motors and their starters are less expensive than 4000-volt motors and their starters. This can be seen by comparing Curves B, C, Fig. 1.

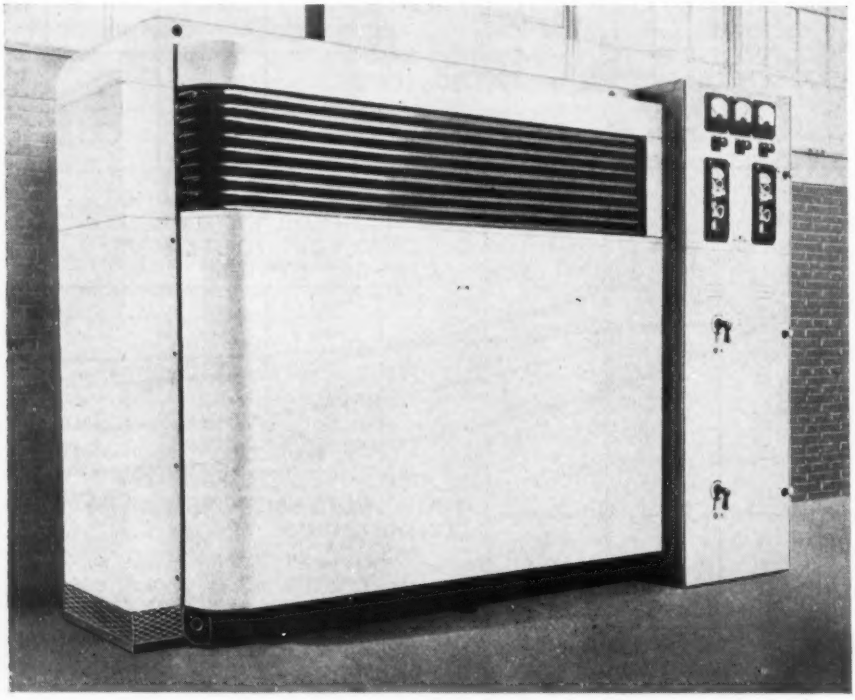


Fig. 2.—Load-center unit substation comprising primary D&W cutouts, 750-kva 3-phase 2400- to 480-volt dry-type natural-draft transformer section, two Type AE-1-25 feeder air circuit breakers, one voltmeter and two ammeters with transfer switches, and two watt-hour meters.

Effect of Various Types of Motors and Control

Where 2300-volt motor starters of 50,000-kva interrupting rating can be used, some reduction can be obtained in the over-all cost of the 2400-volt installation compared with the lower voltage installation for motors below 200 hp. This merely reduces the crossing points of Curves A and B, Fig. 1, to about 150 hp.

Even if plain motor starters (the use of which is not generally recommended) without built-in short-circuit protection are considered for both the 2300- and 4000-volt motors, there will be little change in the relationship of Curves A and B. These variables, together with the effect of explosion-proof requirements, have little bearing on the basic factors presented here. As a matter of fact, most variables, such as special induction motors, or special starters, will tend to make Curve B cross Curve A at a higher horsepower rating than shown in Fig. 1. Although Fig. 1 is plotted using 1800-rpm motors as a base, other motor speeds over the 600-3600 rpm range have little effect on the general relationship of those curves.

Synchronous Motors

There is less price differential between low voltage (600 volts or less) and 2300-volt synchronous motors and control than there is between induction motors and control for these voltages. This differential will tend to make Curve B cross Curve A at about 150 hp instead of 175 hp, as shown for induction motors, Fig. 1.

Motors Larger Than 200 HP Operating at 600 Volts and Below

In many industrial plants, the great majority of the motors are rated less than 200 hp and hence are operated from 460- or 575-volt distribution systems. In these plants there may be one or two motors which are considerably larger than 200 hp. It is often more economical, depending upon the size of the motor, to operate these larger motors directly from the 460- or 575-volt system than it is to provide a special transformer to step down to 2400 or 4160 volts where the primary voltage is above 5 kv.

Summing it all up, it is, in general, most economical to operate all motors rated 200 hp and less on systems rated 600 volts or less, regardless of the primary voltage. Where a choice of primary voltage can be made, it is in most cases more economical to select 4160 volts rather than 2400 volts, even where the percentage of motors above 200 hp is as high as 50 to 60 per cent of the total plant load.

HEADLINERS in the NEWS

HOMER E. KIEWEG, previously superintendent of the Penicillin Plant at Terre Haute, Ind., has been appointed chief engineer of Commercial Solvents Corp.

J. ECKARD WHEELER, formerly process superintendent, has been named superintendent of the Terre Haute, Ind., plant of Commercial Solvents Corporation.

ROBERT H. KITTNER, formerly engineer with American Hard Rubber Co., has joined The Glenn L. Martin Co., as manager of its newly created plastics and chemicals division.

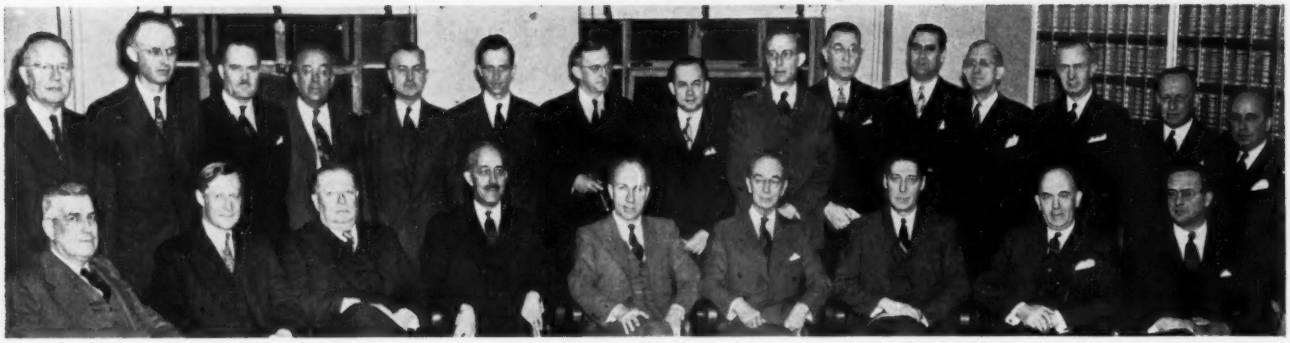
EDWIN A. RUSSELL, director and sales manager of the Philadelphia Quartz Co., has been named vice-president in charge of sales. He is a director of American Doucil Co.

J. M. SELDEN, secretary of R. W. Greeff and Co., has been elected to a vice-presidency. Mr. Selden was formerly vice-president of the Selden Co.

M. B. GENTRY, vice-president of the Freeport Sulphur Co., and Cuban-American Manganese Corp., has been elected to the board of directors of the latter concern.

ARTHUR M. MILLER, who was formerly director of the TVA department of chemical engineering, has been appointed assistant to the president of Rohm & Haas Co.

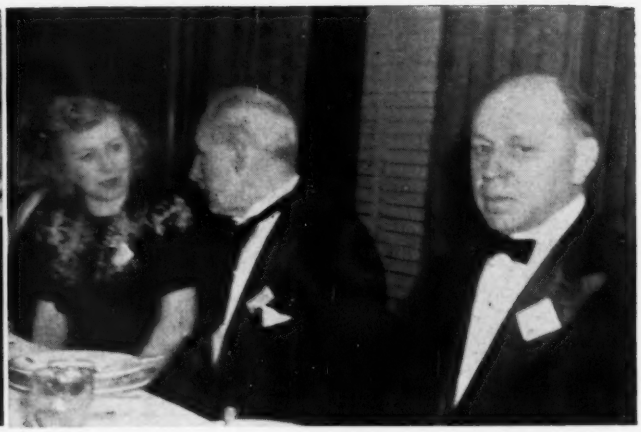
EDWIN F. NELSON, head of the engineering and development department of Universal Oil Products Co., has been elected vice-president of the company.



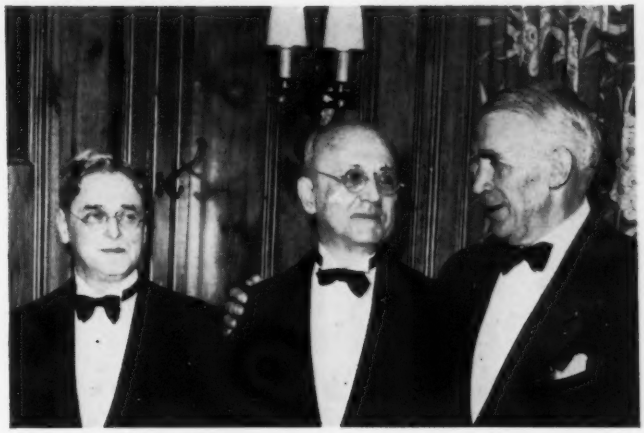
Pittsburgh Plate Glass Officials Meet

Directors of Pittsburgh Plate Glass Co. joined last month to hear glass, paint and chemicals research developments discussed. Pictured above in the first row are R. B. Tucker, R. Pitcairn, E. D. Griffin, E. T. Asplundh, H. Pitcairn, C. M. Brown, chairman, R. L. Clause, H. B. Higgins, H. Brown, back row, J. Wilson, D. Means, C. R. Fay, comptroller, A. S. Polk, P. Croll, A. Pechukas, F. Cox, W. Lycan, D. Hill, W. I. Galliher, H. Post, W. V. Simmons, treasurer, H. R. Kluth, D. C. Burnham and G. West. Studying various types of glass used in allied war planes are: vice-president R. B. Tucker; Dr. Frank Cox, glass research; vice chairman R. L. Clause, and John Wilson, manager glass manufacture. Paul Croll, assistant to vice president; E. D. Griffin, vice-president in charge of the paint division; and Dr. Lycan, paint research director, look at some results obtained by fractionation of domestic oils.

N.Y. Section A. C. S. Awards



The New York Section of the American Chemical Society and the Society of Chemical Industry met together recently to award the William H. Nichols Medal to Vincent du Vigneaud of Cornell University Medical College, for his researches on biotin and other outstanding contributions in biochemistry. He is shown receiving the medal from Robert Calvert, with Beverly L. Clarke looking over his shoulder and Carl S. Marvel, at the extreme right. Among those at the speakers' table, from left to right, were Cornelia T.



Photographed a few minutes before the presentation, from left to right are: Gaston F. DuBois, 1914 Perkin medalist and Monsanto vice-president; Dr. Kyrides, and Charles Belknap, president of Monsanto. Below, men seated from right to left at the head table are: Dr. C. S. Marvel, president of the American Chemical Society, Dr. C. W. Rodewald, chairman of the St. Louis Section, Dr. Harrison Hale, professor of chemistry at the University of Arkansas, Dr. Kyrides, and Dr. H. H. Willard.

Kyrides Receives Midwest Award

The St. Louis Section of the American Chemical Society has honored Lucas P. Kyrides, research director of the organic chemicals division of Monsanto Chemical Co. by presenting to him the first Midwest Award, which is a gold medallion, to be given annually to the outstanding chemist of nine midwestern states. He is shown above (left) receiving the medal from Dr. H. H. Willard, professor of chemistry at the University of Michigan.

Nichols Medal to Du Vigneaud

Snell, former secretary of the New York Section, Hans T. Clarke, College of Physicians and Surgeons, Columbia University, who spoke on "The Work of the Medalist," Robert Calvert, chairman of the jury of award, Dr. du Vigneaud, and Beverly L. Clarke, presiding chairman. Edwin J. Cohn, professor of physical chemistry Harvard Medical School, addressed the meeting on "Vincent du Vigneaud—The Man." Beside him was D. D. Van Slyke, member of the Rockefeller Institute, with Joseph C. Hinsey, next.

Canadian Professor Works on RDX

Dr. George F. Wright, professor of chemistry, University of Toronto is pictured here with the original reactor used in making Canada's first batch of RDX. This Canadian contribution to the war effort is 1.5 times as powerful as TNT and detonates 1.2 times as fast. Every available bit of space in the university's chemistry building has been used to produce the explosive. One machine used to roll out RDX in plastic form has been operating in an elevator shaft, for lack of other floor space.

Textile Institute Research Training Center

The 16-room mansion shown at right, which now houses chemistry and physics laboratories, will become the administration building for the Institute of Textile Technology when the school's new construction program is completed. Plans are proposed for lecture buildings, dormitories, a library, assembly hall and laboratories to contain every type of machine used by the textile industry. Supported by assessments on more than 100 member textile mills, the institute was created in 1943 and is run on a non-profit basis. Its aim is to train future scientists for the textile field, to develop production techniques and to carry out research for their sponsors. Specific assignments will be done by the permanent staff which will eventually number over 100 persons. Fellowships to 15 students will be awarded annually for work toward master's and doctor's degrees.

Army Develops Colored Smoke

Colored smoke grenades, useful for conveying messages from the air, have been developed through intensive research and field experiments at Edgewood Arsenal, Md. Known as the M87, the bomb is small and light, yet gives off a large volume of colored smoke. Hundreds of dyes were tested and discarded because they could not fulfil the rigid requirements. It was necessary that the dye be stable both in storage and under the extreme heat of burning, and be available in large quantities. Anthraquinone dyes were finally selected. The grenades are made in red, yellow, green and violet. No pictures of the M87 are available yet, but those shown here are of a similar type, except that the smoke is white.

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GLYCEROPHOSPHATE, MAGNESIUM White powder. 2.0% max. retained on 60-mesh screen; 4.0% retained on 80-mesh screen; 10.0% max. retained on 100-mesh screen	**GLYCEROPHOSPHATE, SODIUM, N. F.** White crystals. No crystals rstained on 10-mesh screen; 40.0% min. retained on 80-mesh screen.		

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BETWEEN THE LINES

The Glass Situation

The war has brought little change to the American sheet-glass industry, and while it is maintaining an exceptionally high level of production, at no time has it utilized more than 85 per cent of its real capacity. Postwar prospects for increased export trade are bright until the European industry has a chance to regain its previous favorable position.

ALTHOUGH glass manufacture has progressed markedly since World War I in the direction of increasingly greater mechanization, the basic raw materials used in the manufacture of sheet glass have remained about the same today as in the early days of the industry. These raw materials are principally silica sand, soda ash and lime, plus a few others such as sodium sulfate, arsenic, and cullet. The latter is simply broken glass, but is one of the most important ingredients, often comprising up to 40 percent of the total quantity of raw materials entering a mix.

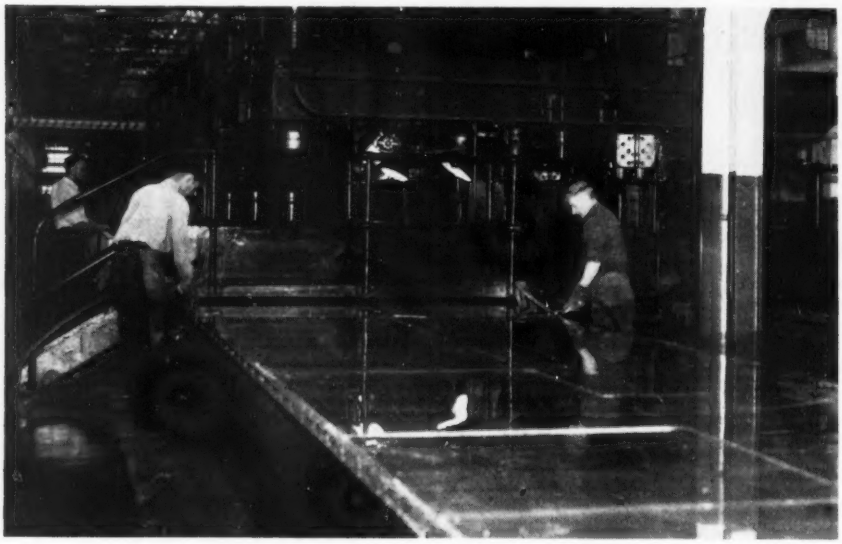
The mixing of these raw materials, as the first step in the manufacture of sheet glass, is today accomplished almost entirely by machinery. A high degree of mechanization is found in subsequent handling—overhead conveyors for the mix, sheet-drawing processes, and others. The proportions and degree of refinement of the ingredients have varied somewhat from time to time, according to type of furnace operated, technical knowledge of the operators, and with the introduction of more and more machine operation. A high degree of uniformity in the composition of the raw materials and in the temperature of the molten glass mixture is essential to production of sheet glass of standard thickness and quality.

For successful operation of the drawing process it has been necessary to alter the proportions of certain materials to avoid crystallization at the temperature necessary for drawing. The proportions of the various raw materials now used in manufacturing sheet glass are stated to be approximately within these ranges:

Silica sand, 40-50 percent; soda ash, 15-20 percent; lime, 10-15; cullet, 20-40; other material, 1-5 percent.

Since glass of good quality can be produced only by the use of raw materials of a high degree of purity, manufacturers select their materials with considerable care. However, raw materials represent only about 15 percent of the total production cost, according to figures which the U. S. Tariff Commission has obtained and from whose studies these facts have been derived.

The Tariff Commission is presently preparing data on a number of industries with a view of making recommendations for postwar treatment in the way of duties, legislation, and other matters of policy. The trend of the Commission's findings so far indicated, is to at least a temporary shift in the situation of the sheet glass industry as compared with its prewar position.



It is estimated that United States exports of sheet glass will run about 58,000,000 lbs. annually for several years after the war.

The world capacity for sheet glass production is estimated at 5 to 6 billion pounds annually, of which about one-fifth is represented in the United States industry. The latter industry leads in production. The great bulk of the world's sheet glass was produced in a relatively few countries normally, including this country, Belgium, Czechoslovakia, the U. S. S. R., Japan, Germany, the United Kingdom, and France.

Whereas this country's exports of sheet glass have been only of minor importance, representing less than 1 percent of its total output, Belgium and Czechoslovakia alone among the other producers supplied about 70 percent of total exports during the 10 years preceding the present war. Our own imports in fact, prior to this war, came primarily from the two foreign producing countries mentioned, and Germany. Prohibitive duties, up to 50 percent ad valorem, lower U. S. prices, increased domestic efficiency in production, the depression of the 1930's, and other factors resulted in a gradual lessening of the importance of these imports, however.

Taking into consideration only physical requirements, the total European output as it is now estimated, will not be sufficient to repair the war devastation on the other side. Not only the rebuilding of demolished structures but the glazing of hundreds of thousands of windows broken by nearby concussions is expected to take all the glass those countries can produce for several years. Moreover, the extent of destruction of the European glass factories themselves is not yet known. Information at hand is that they have largely escaped severe damage, however.

While imports into the United States have practically ceased during the war, U. S. exports have greatly expanded, in 1943 amounting to more than 5 percent of domestic production, or more than 45,000,000 square feet. With the cessation of exports from Europe and Japan, the United States has, in fact, become the main source for Non-Axis markets, especially South and Central American countries.

Until the European sheet-glass industries are able to resume export trade on the scale they enjoyed before the war, it is now believed, the United States will be called upon to supply a large part of the world's export markets. It is estimated as likely that United States exports will annually be at the approximate 1943 level, or about 58,000,000 pounds, for several years after the war.

On the other hand, despite the demand at home, European glass-producing coun-

(*Turn to page 657*)

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Oxalates . . . calcium, sodium.

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Phosphorus compounds . . . chlorides, pentoxide.

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Sulphates . . . magnesium, sodium aluminum.

Here's good news! Expanding output is beginning to overtake even wartime demands. Today, Victor Formic Acid is available for immediate shipment. A clear, colorless, uniformly pure, and completely volatile liquid, Victor Formic Acid is produced in both 90 % and 85 % concentrations, weighing approximately 10 lbs. per gallon and packed in 120-lb. and 130-lb. glass carboys. Prompt shipments can be made from Chicago Heights, Illinois, plant or east coast warehouse stocks.

In the **textile industry**, Victor Formic Acid is widely used as an acidulant in the dye bath . . . for wool, silk, cotton and other textiles. It is especially recommended where exhaustion of the dye bath is incomplete or where mineral acids are too strong for proper penetration and levelness. Since Victor Formic Acid is completely volatile it will not cause any decrease in the tensile strength of the fabric. For further details send for special booklet.

In the **tanning industry**, Formic Acid offers definite advantages in removing lime from the pores of bated hides. The grain side is generally cleaner, a more evenly colored leather results, and there is no unnecessary waste of hide substance.

In the **laundry**, Formic Acid is sometimes used as a sour to prevent yellowing of fabrics when ironing.

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NEW PRODUCTS & PROCESSES

Styrene-Butadiene Plastic Announced by Dow

Development of a new chemical compound which is a cross between plastics, rubber and wood, has just been made public by the Dow Chemical Company, with the announcement of a new million dollar plant to manufacture the material on a mass production basis.

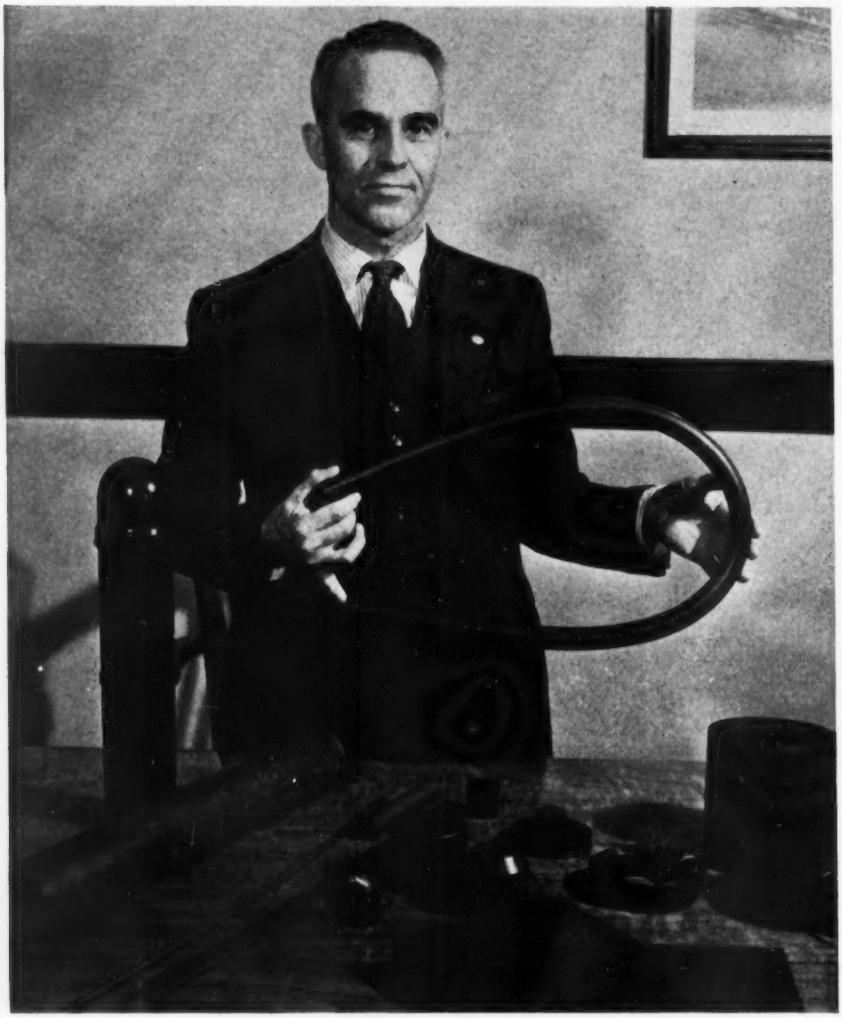
The new rubber plastic, called Styraloy, is made from styrene and butadiene. So light that it floats on water, Styraloy has exceptional electrical properties, can be worked like wood, and as a molding powder lends itself to all common forms of plastic fabrication.

The new compound is manufactured in the form of a dark, blue-grey powder to form products which have varying degrees of hardness, from nearly as soft as rubber to very hard and tough.

Its electrical properties definitely place it in the field of low loss, low capacitance, high dielectric strength insulating materials. Among other features of the material are abrasion resistance better than shoe leather, low moisture absorption and ability to remain flexible over a temperature range of —90° F. to well over the boiling point of water.

Styraloy has shown marked advantages as a compounding ingredient with a wide variety of synthetic rubbers and with some thermoplastics. It confers good electrical properties, better moisture resistance, and improved low temperature flexibility on such materials. This composition of properties is particularly advantageous for certain types of military communication cables.

In the molding field, pipe fittings, bushings and antenna insulators are being fabricated of Styraloy. Its elongation is useful where metal inserts are involved because it will withstand wide temperature variations without cracking. In compression molding, tough rubber-like sheets varying from 1/32" to one inch in thickness have been formed. Sheets .005" to .060" thick have been made by the calendaring process. Channels, angles, stripping, conduit pipe and rods are fabricated by extrusion. All common machining operations, drilling, turning, milling, sawing, boring, grinding and polishing can be applied. In assembly it can be cemented to itself, similar plastics or other materials with adhesive bonds. Friction welds develop strength equal to that of the plastic itself.



Donald L. Gibb, manager of Dow's Plastics Engineering Division, exhibits a sample of the company's new styrene-butadiene plastic, Styraloy.

New Synthesis Of Histidine

A new synthesis of histidine, an amino acid occurring in relatively large quantities in blood corpuscle paste, has been developed in the laboratories of the Winthrop Chemical Company, Inc., Rensselaer, N. Y., by Drs. N. F. Albertson and S. Archer.

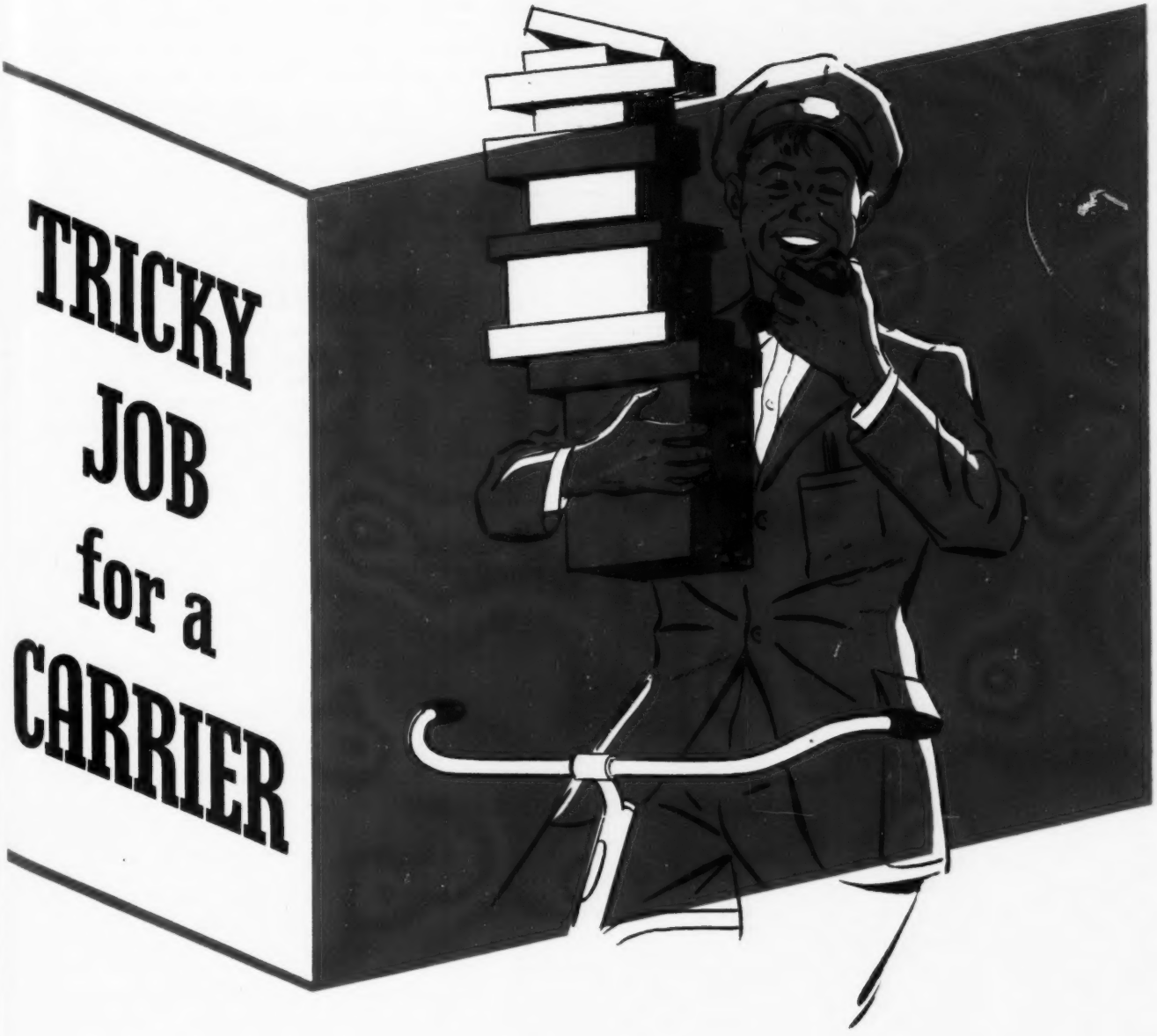
Present method for synthesizing this amino acid, known as the Pyman method, has not been employed to any great extent because of the difficulties involved in some of the steps as well as the large number of steps required.

The new synthesis employs fruit sugar as a starting material, and converts the sugar to histidine in a series of four steps, according to Drs. Albertson and Archer.

Chlorinated Paraffin

A new and entirely different type of chlorinated paraffin, resinous in nature, and with flame-resistant and moisture-resistant properties has been announced by Diamond Alkali Company, Pittsburgh 22, Pa. It has been named Diamond Chlorowax.

Chlorowax has already been accepted as a valuable ingredient of coating compounds to render them flame-resistant and water- and moisture-proof. These are applied as paints and as textile finishing compositions. Chlorowax may be used in electric cable coating compositions because it is compatible with all the film-forming materials and plasticizers which are commonly employed for this purpose. Diamond Alkali Company points out that these are but a few of the uses which have been developed, and the company is certain that other applications will be developed and applied commercially. Many



A satisfactory catalyst carrier must be versatile. It must be able to do a number of jobs at the same time and do them equally well.

Some solid catalysts are soft or easily crumbled and cannot be formed or produced as durable particles. Engineers find it difficult to predict their performance with accuracy. Many catalysts give rise to a reaction that is too rapid or too severe. Thus, a successful carrier may be required not only to support the catalyst but also to disperse or dilute it to exacting requirements.

Porocel has properties which recommend it as a carrier for many catalysts. Its high surface area enables it to adsorb the catalyst intimately and present it in active, evenly dispersed form. Its rugged particles maintain their granular form and size in the presence of liquid or vaporous reactants under widely varying conditions of flow or temperature. Porocel, being chemically inert to many catalysts and organic reactants, does not interfere with the basic reactions.

And Porocel is inexpensive. Its cost is trifling compared with that of active catalysts.

The versatility and low cost of Porocel are important to research directors and organic chemists confronted by a riddle in catalysis. Porocel may be the carrier you have been looking for. We will be glad to discuss your individual problems. Address Attapulgus Clay Company (Sales Agent), 260 South Broad Street, Philadelphia 1, Pa.

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such projects are under way at the present time.

Chlorowax is produced by allowing selected paraffin wax and pure chlorine to react in a carefully controlled process which insures a uniform product of high quality and maximum stability. Under ordinary conditions it shows very little chemical activity. At higher temperatures, however, Chlorowax will enter into some reactions, dissolves more readily, and gives more concentrated solutions. An important physical property is its compatibility with a large number of plastics and film-forming materials.

A new technical bulletin on Chlorowax gives complete information on the product together with specific tables and data on its properties. Copies may be secured through this publication or by writing direct to the company.

New Plasticizer

Low-temperature flexibility and low volatility are combined in a new plasticizer, dioctyl sebacate, offered by the Resinous Products & Chemical Co., 222 W. Washington Sq., Phila., Pa.

It is particularly designed for use with polyvinyl chloride, and in such formulations it imparts flexibility down to —70° C. In this respect, and also with regard to heat stability and flammability, it is superior to dioctyl phthalate. With respect to 100 per cent modulus and oil susceptibility, however, it is inferior.

Its physical properties are as follows:

Color	Colorless to very pale amber
Odor	Faint, ethereal
Boiling Point	256° C. at 5 mm.
Freezing Point	—48° C.
Acid Number	0.20 max.
Specific Gravity 60° F./60	.917
Lbs. per Gallon	7.6
Viscosity at 100° F.	.115 poises
Refractive Index at 20° C.	1.4496
Saponification number	260
Flash point	415° F.
Fire point	495° F.

Dioctyl sebacate is now in commercial production, and samples are freely available for testing purposes. It is not under allocation at the present time.

New Germicides

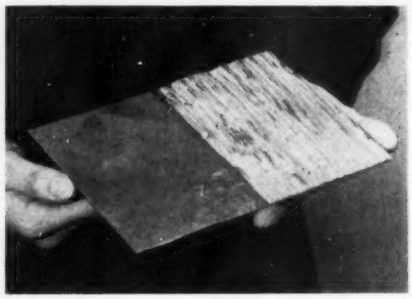
The research laboratories of Givaudan-Delawanna, Inc., manufactures of synthetic organic chemicals and aromatic materials, have synthesized two new phenolic compounds having interesting germ-killing powers, according to a booklet just published by the company.

The new disinfectants are described as halogenated dihydroxydiphenyl methanes, and the two most important members of the group are known under the trade names of Compound G-4 and Compound G-11. The former is 2,2′-dihydroxy-5,5′-dichlorodiphenylmethane; the latter is 2,2′-dihydroxy-3,5,6,3′,5′,6′-hexachlorodiphenylmethane. Both are colorless solids with high melting points (176° and 146° respectively), and practically odorless. They are poorly soluble in water, readily soluble in alcohols and ketones, slightly soluble in mineral oils and hydrocarbon solvents, but soluble in many of the fatty acids and their esters.

Rubber-Base Adhesive

A new rubber cement, named Plastilock 500, a non-thermoplastic, water and aromatic oil-resistant adhesive for bonding metals, wood, plastics and ceramic material to themselves or to each other is announced by the B. F. Goodrich Company, Akron, Ohio. The company claims it provides superior bonding qualities in any of its applications, and in some cases can be used in place of rivets or screws.

In using Plastilock 500 the company advises that best results are gained by applying heat with pressure, although heating alone will give some degree of



adhesion. Purpose of the pressure is to obtain good surface contact. The bond strength varies with the materials being adhered.

The new adhesive, used for metal-to-metal bonding, has shown a shear strength of 3,250 pounds per square inch. Tension strengths of 4,000 pounds per square inch have been reached. Tests made after the bonding of wood and plastic to aluminum, which presents extremely difficult problems of adhesion to other materials, have resulted in the wood and plastic being torn because the strength of the bond was greater than that of these materials.

New Insecticide

The Apex Chemical Co., Inc., 200 S. 1st St., Elizabeth, N. J., has announced a new insecticide, known as Salp. The active principle is sodium antimony lactophenate; and while it is toxic, it does not affect water-soluble chlorophyll and is suitable for outdoor as well as indoor use.

It has been proved successful against thrips, leaf rollers, and other chewing insects infesting ornamental crops (roses, gladioli, chrysanthemums, carnations, dahlias, etc.) as well as miscellaneous garden flowers and vegetables of all kinds whose underground portion is attacked.

Since it is in liquid form, it is more conveniently handled than paris green or lead arsenate, the manufacturer claims. When handled properly it does not injure the plants nor discolor the foliage. It is completely effective during hot, dry periods, and it may be stored for long periods without deterioration.

Wood Treatment

Dr. Joseph A. Hartig has perfected a chemical process that promises to extend the use of wood.

The perfected Hartig process consists of a simultaneous evacuation of nature's sap and moisture from a tree log and their replacement with either color, plastic impregnation, creosote or paraffin, partially or completely through the veins or cellular structure of the log.

The process is claimed to open up a new vista for lumber uses in the conventional fields of building and furniture and the door to markets previously closed to lumber because of the limitations in the range and variety of color treatment. Moreover, scavenger logs are as subject to the process as are standard logs of both the hard and soft species. Then, too, the by-product recovery of saps, ranging up to 35 gallons per log, for colloidal chemical and medical purposes, itself offers many new potentials.

With the growing demand for color in products ranging all the way from furniture, cabinets, toys, veneers, radio cabinets, novelties, to wall paneling, interior trim and flooring, the Hartig process makes possible an important contribution. There are also the commercial possibilities of vermin, weather- and waterproofing of lumber afforded by the Hartig process through impregnation of camphor, paraffin, or creosote. Such lumber for shipbuilding, dock piling, and the railroad tie industries would offer increased utility, greater longevity, reduction of shrinkage losses, and lower unit costs.

The fixed investment cost of the machine equipment for the Hartig process is small when compared with the volume of finished material which is obtained from the treated logs. One machine can easily process 10 logs of, say, 20 inches to 40 inches diameter in a seven-hour day; multiple units can treat 10 logs at a time with low requirement for manual labor. A single machine can produce up to 100,000 feet of 1/20 inch veneer, a multiple unit up to 1,000,000 feet, per day.

Three-Phase Emulsion For Pigment Dyeing

A new type of pigmented emulsion, announced by the Aridye Corporation, employs a novel physical structure which imparts certain inherent advantages in the dyeing operation.

A three-phase emulsion is used: (1) a continuous phase consisting of an unpigmented low-solids-content lacquer; (2)

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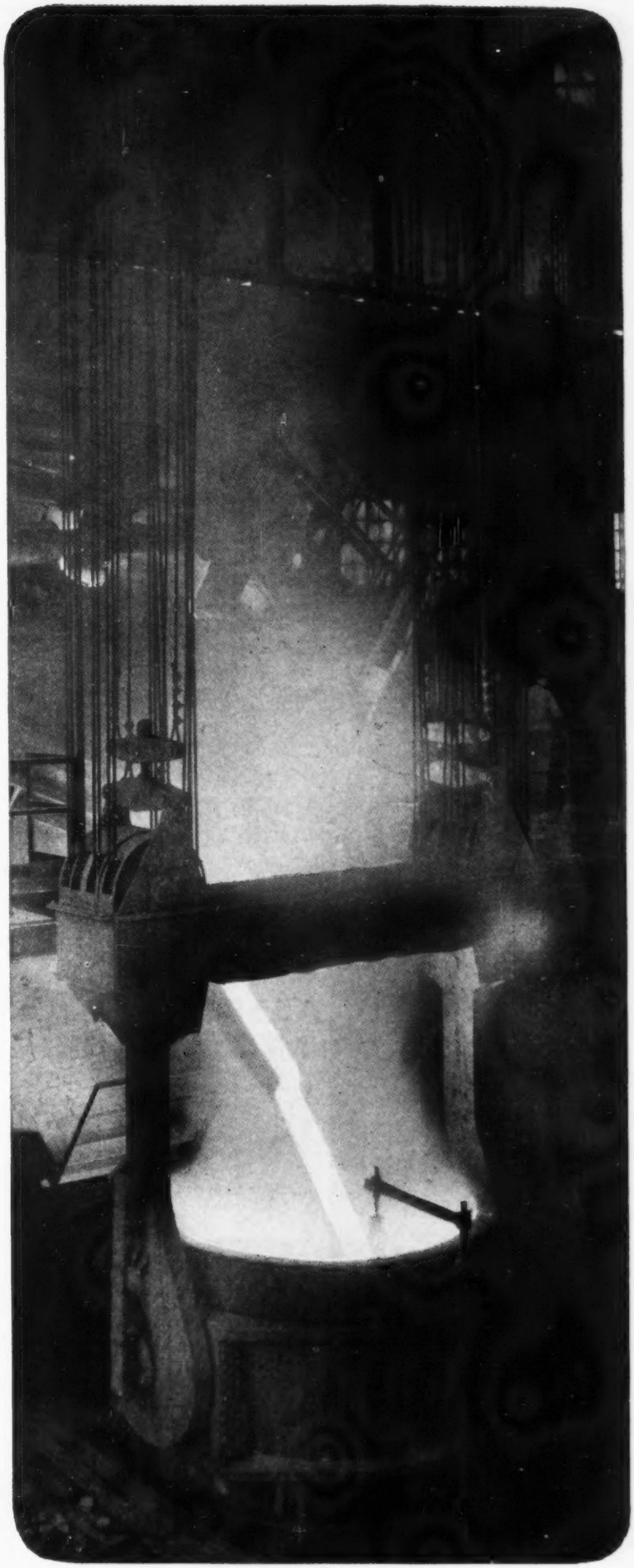

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one dispersed phase consisting of an aqueous fluid; and (3) a second dispersed phase consisting of a concentrated pigmented resin-solvent aggregate.

The new type of emulsion permits the shipment of pigment colors in a more concentrated form than was possible heretofore. The concentrated pigment can be diluted to the desired shade without danger of flocculation; and, furthermore, the use of the emulsion has less effect on the hand of the fabric.

Low-Temperature Phenolic Adhesive

A new, low temperature phenolic adhesive has been developed by the Plastics Division, Reichhold Chemicals, Inc., Detroit, which cures at room temperature. It is claimed that this adhesive has great possibilities, as it solves many difficult, and some heretofore practically impossible bonding problems. It cures at temperature as low as 75° F. in a reasonably short time and results in a bond resistant to boiling water, prolonged immersion in water, alcohol, and almost all solvents, etc., except strong alkalies and oxidizing acids.

The set bond is neutral and will meet the requirements of the Army Air Force Specification No. 14124 and other specifications where a low temperature adhesive is required for wood bonding. It is particularly adaptable for bonding large prefabricated sections such as parts of an army glider that cannot be placed in a press. Other present applications are aircraft spars, heavy duty construction arches, ship timbers, lamination of heavy lumber, and many other aircraft and marine constructions.

New Flame-Resistant Plastic

The development of a plastic combining the qualities of fire- plus shock-resistance and easy molding properties is announced by General Electric.

Intensive research begun in the company's plastic laboratory at the request of the Navy Department has produced a product that can withstand fire and its resultant toxic effects, as well as concussions and vibrations. Navy specifications called for a plastic that was relatively fire-resistant and non-toxic, and had good electrical properties, high impact strength and easy moldability.

The laboratory men, working with Dr. Howard W. Haggard of Yale University, learned that it was impossible to use any appreciable amount of organic filler in a laminated plastic or molding compound to fit these specifications, regardless of what kind of resins were used, without obtaining a material that gave off toxic gases fatal to human beings, depending on several factors including the size of the room and length of burning.

The chemists then turned to the use of inorganic filler-type of materials, such as asbestos and glass, selecting finally asbestos as the type of inorganic filler they wanted because it embodied all of the specifications.

The researchers then bound the asbestos fibers together with certain phenolic resins to make a series of plastics with various shock resistances.

Glass, the other inorganic material, is used in another plastic development for the Navy. This type of plastic is used as panel board on ships. It is made by bonding layers of glass cloth together with melamine resin in high-pressure presses.

Mold Spray

The development of a new solvent-type mold spray for use in the foundry industry has been announced by Hercules Powder Company.

Made from a special resin and dissolved in a quick-burning solvent, Truline Mold Spray 91, which was developed by the company's Naval Stores Department, is applicable to the production of steel, iron, and nonferrous castings.

Tests just completed in the Hercules foundry laboratory and in several large industrial foundries in regular production, on both natural and synthetic bonded molding sands, show that Truline Mold Spray strengthens, hardens, and dries the mold surface in one operation.

Plywood Adhesive

A new adhesive, promising to lower plywood production costs by cutting bonding and assembly time in hardwood plywood, is announced by the Resinous Products & Chemical Company, Washington Square, Phila., Pa. Known as Amberlite PR-245, this resin is a thermosetting phenol-formaldehyde in dry powder form which is readily soluble in water, alcohol, and mixtures of the two.

This adhesive assures durable bonds, moderate flow during cure, fast cure at usual bonding temperatures and ability to cure at temperatures as low as 160° F. This fast curing property substantially increases the output of a hot press and thus lowers the glue line cost. In bonding either plywood or laminated constructions, the resin is used with Catalyst Q-108 to accelerate rate of cure.

Oil and Rust Preventative

The Hood Refining Company, 150 N. Hamilton Ave., Greensburg, Pa., manufacturers of special oils and greases for industrial use, announces Gibraltar "Rad-Treat"—a compounded oil and rust preventative which emulsifies quickly with

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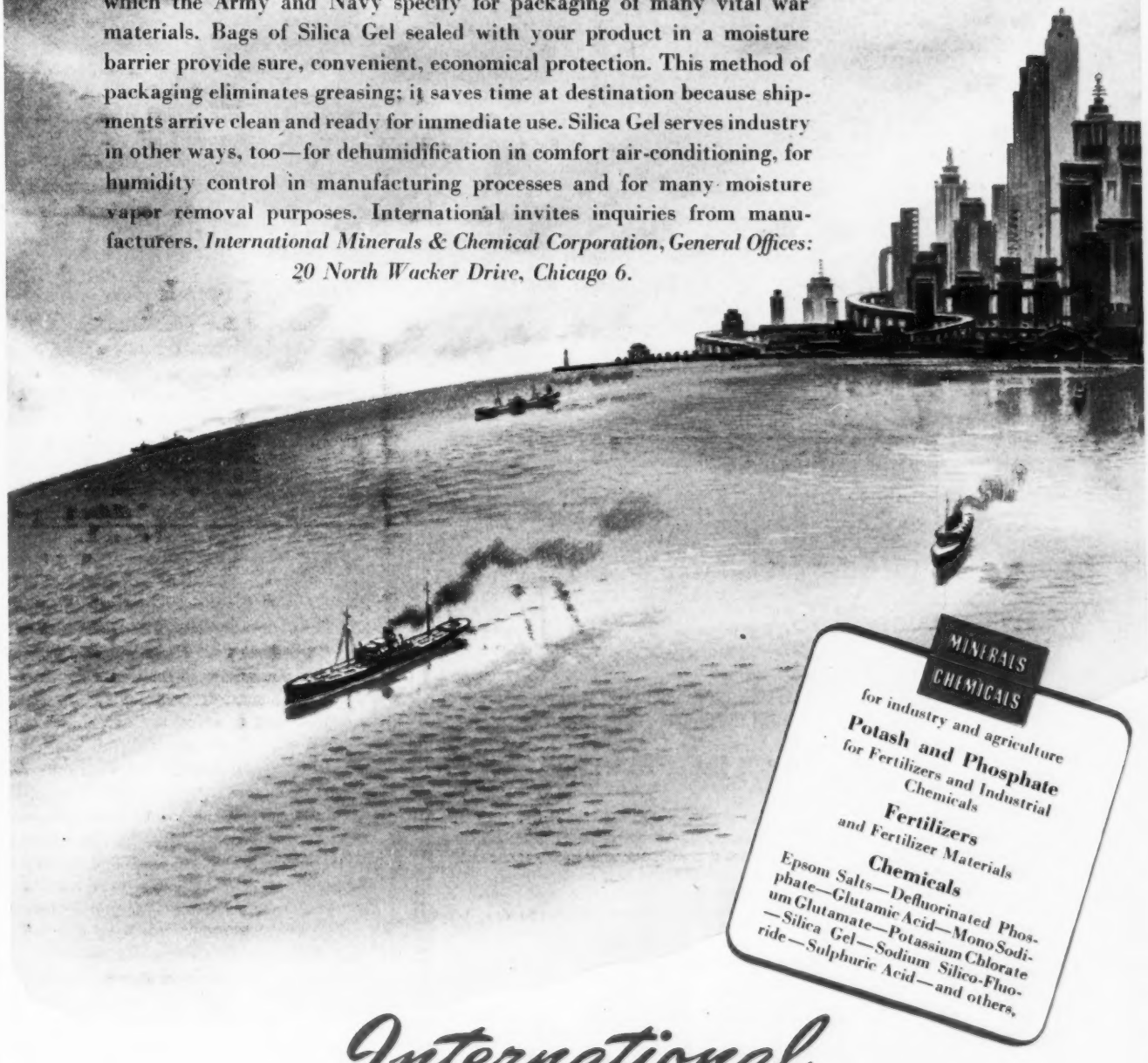

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Epsom Salts—Defluorinated Phosphate—Glutamic Acid—Mono Sodium Glutamate—Potassium Chlorate—Silica Gel—Sodium Silico-Fluoride—Sulphuric Acid—and others.

International MINERALS and CHEMICALS

CHEMICALS • PHOSPHATE • POTASH • FERTILIZER

water or any anti-freeze. It is not a solvent but will keep radiators, water jackets and cooling systems clean and will prevent rust and corrosion.

Gibraltar Rad-Treat will also lubricate packing glands in pumps, at the same time preventing shrinking and glazing of packing.

Light-Colored Plasticizer for Rubber

Para Lene-W, a new light-colored softener and plasticizer for synthetic rubber, has been developed by The C. P. Hall Company and now is in production.

The new form of Para Lene has tested equal in almost every respect to the parent compound; it has been prepared specifically to meet the increased interest in light-colored GR-S stocks and in black stocks which do not stain white finishes.

As a plasticizer for GR-S the newly-developed compound is equal in action to Para Lene. Neither compound affects the rate of cure of GR-S to any appreciable extent. The aging properties of Para Lene-W stocks are equal to those of stocks containing Para Lene.

Tentative specifications for Para Lene-W include acid and iodine numbers less than 20, ash less than one-half of one per cent, less than one per cent soluble in acetone, flash point above 350 degrees F., and pour point below 70 degrees F.

Resin Glue

Bakelite Corporation, 30 E. 42nd St., New York 17, N. Y., announces the introduction of XC-17613—a cold-setting phenolic-resorcinol resin glue for wood bonding which provides maximum water resistance for exterior plywood applications.

XC-17613 was specifically developed to meet demands for a cold-setting phenolic resin glue for the lamination of heavy lumber, beams, arches, and ships' timbers. It is also used for plywood glider fuselages, aircraft and marine construction and meets the necessary specifications for this work, including Army Air Forces Specification 14124.

New Cement

Duracite, a new acid- and alkali-proof cement for bonding brick or tile in acid-proof masonry construction, is a resinous cement based on U. S. Stoneware Company's Duralon series of furane resins. Duracite comes in the form of a liquid and powder which are mixed on the job at the time of use. It is of the quick-setting type, taking an initial set in less than thirty minutes.

Duracite shows virtually zero absorption characteristics, and excellent resistance to most inorganic acids, organic acids, all alkalies, oil, and solvents, at temperatures up to 375°F.

Unlike most resinous cements Duracite has a practically indefinite shelf life, showing no deterioration in storage.

Duracite has been under thorough field tests for more than three years. It is now available for general usage for the first time.

Hydrocarbon Resins

A series of polymers of styrene and its homologs has been introduced under the trade name Piccolastic by the Pennsylvania Industrial Chemicals Company, Clairton, Pa.

Permanently thermoplastic and stable up to 175° C., these resins are of sufficiently pale color to be suitable for most uses.

Piccolastic A-5 is a low viscosity liquid at room temperature, useful as a dissolving plasticizer for GR-S, polystyrene, ethyl cellulose, polyvinyl chloride and acetate, and chlorinated rubber. It may be used to give elastic or tough films, coatings, and molded objects.

Piccolastic A-25 is a highly viscous material of similar solvent characteristics. It may be used to give sticky, tacky adhesive-type compounds.

Optical Crystals

A method for manufacturing certain optically important crystals readily and larger by far than any nature has ever been known to produce is described by Dr. Cutler D. West, senior research chemist of Polaroid Corporation, Cambridge 39, Mass. The method involves the use of mica as a means to control the atomic arrangement required for the production of large optical crystals.

It has been known for years that large crystals with the optical properties of calcite might be produced synthetically from molten sodium nitrate. The problem, however, has been to devise a means for controlling the arrangement of the atoms of the molten mass when the temperature is reduced and it starts to harden. With such a control, the crystal ends up in an optically useful form. But with no control exerted on the atoms of the melt, it has a natural tendency to harden in an optically impractical form. No efficient control was known before West disclosed that mica provides the key to the problem of how to arrange the first atomic layer. Once the first atomic layer of the melt has hardened in the correct orientation, subsequent layers orient themselves automatically in the desired manner.

The molten sodium nitrate is poured into an aluminum dish and mica is floated on its surface. The temperature is then gradually reduced and the melt begins to solidify at the mica surface at about 310° C. After the crystal has solidified, the mica is stripped off.

Try These

AMECCO CHEMICALS Now!

CHLORON 120

CHLORON 120 is a new high boiling, inexpensive chlorinated product with excellent solvent properties for oils, fats, waxes and resins. It is suggested for use in emulsion type cleaning and degreasing compositions, as a selective solvent in solvent extraction applications, as a coupling agent and solvent in protective coatings, in chemical specialties and in many other applications.

We will be glad to furnish a sample and further information.

AMECCO CHEMICALS INC.

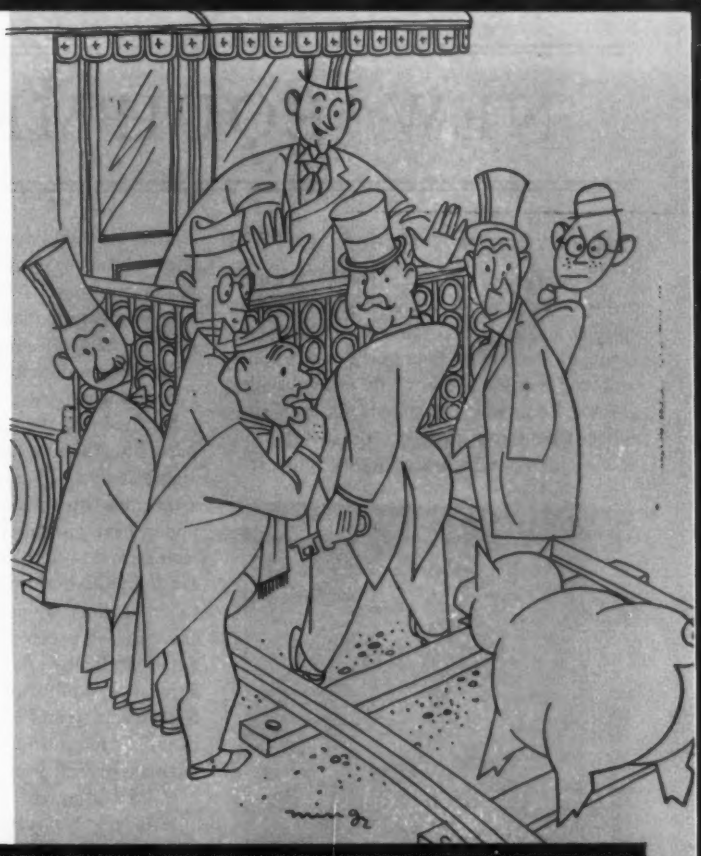
NEW YORK SALES OFFICE • MAIN OFFICE AND PLANT
60 EAST 42nd STREET, NEW YORK 17, N.Y. 75 ROCKWOOD STREET, ROCHESTER 10, N.Y.
ESTABLISHED 1919

F A M O U S

Caustic Comments

A former President of the United States, noted for his caustic wit, was once being welcomed by the painfully pompous dignitaries of a small rural community when, nearby, a pig began to grunt.

The President turned toward the animal and pleaded, "Gentlemen, one at a time, please."



Dow

ONE OF MANY DOW CHEMICALS USED BY AMERICAN INDUSTRY

Caustic Soda

We have a *CAUSTIC* message also:

Dow is exceptionally well situated to supply industry with Caustic Soda and other heavy chemicals in the Dow tradition of service, reliability, and product-quality. Three Dow plants—in California, Texas, and Michigan—are strategically located to serve your needs, wherever you may be.

Dow Technical Advisory Service Available

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago
St. Louis • Houston • San Francisco • Los Angeles • Seattle

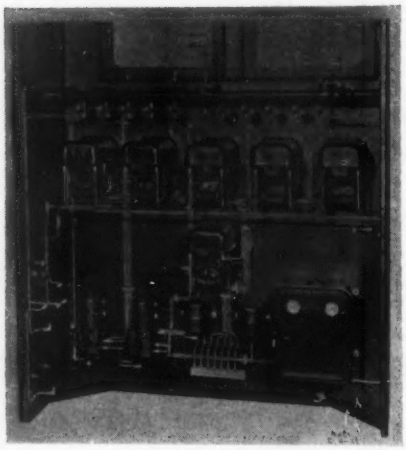
DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

NEW EQUIPMENT

Boiler Control Panel QC 538

Prefabricated boiler control panels which include all necessary connecting piping and electrical wiring for the operation of metering equipment and boiler control systems are now offered by Bailey Meter Company, Cleveland, Ohio, to simplify the user's problem of installation. These panels, which are factory fabricated



and tested by experienced instrument mechanics, are said to save installation time, to insure the use of suitable materials, to reduce total installed cost, and to present a neat, pleasing appearance. All piping and wiring necessary for operation is installed as a unit according to a coordinated and prearranged plan instead of as piecemeal operations.

Small units such as valves, relays, switches, signal lights, and the more sturdy and light-weight instruments are mounted and connected ready for service. Heavy instruments or instruments having delicate mechanisms are shipped separately; but cutout spaces, drilling and all necessary connections are provided so that their installation in the field is a foolproof, quick and easy operation.

Connecting piping and electrical wiring are brought to convenient terminals which are carefully tagged so that no time or effort is lost in connecting the prefabricated boiler control panel to the various units which it controls.

Flax Packing QC 539

Greene, Tweed & Co. announces the development of Palmetto square flax packing which is made by a new method, which produces a superior kind of flax packing.

Until the advent of Palmetto flax packing it has been the custom to plait dry flax rovings to packing size, immerse the plaited packing in a bath of hot tallow and depend upon the packing to absorb the lubricant. Results frequently left something to be desired and it is a recognized fact that flax so made usually became hard in service.

In the manufacture of Palmetto square flax packing each strand is separately lubricated by the same process used to lubricate Palmetto asbestos packing. Each single strand of flax roving is put through a machine which forces high grade tallow under heat and pressure into the core of each strand of flax. After the flax strands are individually lubricated they are plaited to make finished packing. The result of this process is completely internally lubricated Palmetto flax packing, containing a balanced uniform amount of lubricant. Since each strand is separately lubricated, it will remain soft and pliable for long periods of time.

Palmetto square flax packing is available in regular form or in the graphited style sometimes called waterproof hydraulic flax.

Dust Collector QC 540

A powerful yet inexpensive unit type Dust Collector has been announced by the Ideal Commutator Dresser Company.

Standard attachments simplify installation on grinders, buffers, sanders, polishers, lathes and other machines. Being compact in size it readily fits behind or

beside machines as they stand, making re-location of machines, elaborate housing, separate rooms, expensive ducts unnecessary.

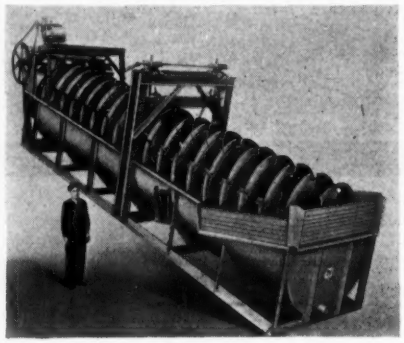
Five hundred cubic feet per minute is developed through the two inlets by a ¾ horsepower, 3450 r.p.m. motor, driving a 7½" dia. x 2" wide squirrel cage blower wheel. Dimensions are 20" x 20" x 38" high.

Dust-laden air is drawn through the inlet pipes into twin cyclone separators where it is whirled around at high speeds. The dust particles being heavier than air naturally move more slowly and drop down into the dust drawer. The lighter air passes on through a viscous coated filter where very fine dust is removed. Clean air is discharged back into the room. The two 3" dia. inlets can serve either one or two machines.

The filter consists of 20 layers of viscous coated filter paper. To restore the filter's efficiency after it becomes dirty, it is only necessary to peel off the first two layers. This can be done five times without affecting its cleaning ability. Under average conditions a filter lasts approximately a year.

Classifier QC 541

Denver Equipment Company has just announced its new Denver-Cross-Flow Classifier. The design incorporates two outstanding features which represent major developments in the classification field, the classifier deriving its name



from the "cross-flow" principle of operation. The overflow weir is on the side opposite the feed, rather than on the end of the classifier; the conveyor flights are in line with the direction of pulp flow across the classifier. These features permit an uninterrupted, smooth flow of pulp across the classifier from feed entrance to overflow weir.

The Cross-flow Classifier eliminates the submerged bearing which has commonly been used in "spiral" type classifiers. The lower bearing is placed somewhat below the middle of the shaft, but above the maximum pulp level. Thus, the bearing is more easily serviced, no special packing or pressure lubrication is required, and danger of bearing trouble from sandy pulp is eliminated.

The Denver Cross-Flow Classifier is made in eleven simplex sizes from 6" to 60" and seven duplex sizes from 24" to 60".

Glass Tanks QC 542

The first successful large-scale installation and operation of all-glass tanks has been announced by the Pittsburgh Plate Glass Co. These tanks are stated to withstand an instantaneous temperature shock of 400 degrees F. and continuous working temperatures of from 500-600 de-

PATTERSON-KELLEY
Heat Exchangers
AND
Process Equipment

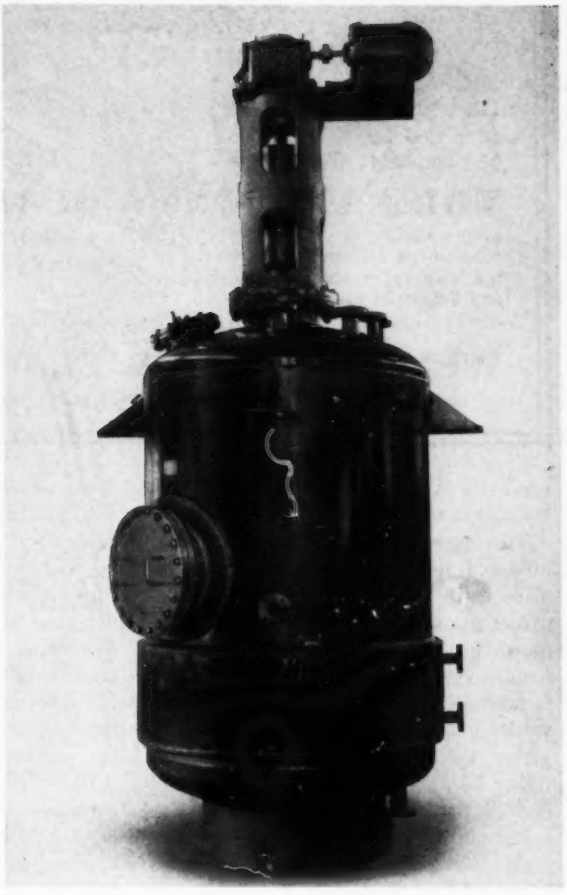
Designed to Pass
4 INSPECTION HURDLES

CODE INSPECTION
OPERATOR'S INSPECTION
MAINTENANCE INSPECTION
APPROPRIATION COMMITTEE INSPECTION

IT'S not such a simple matter as some think to design kettles, heat exchangers, mixing tanks or other processing equipment involving the transfer of heat. The requirements of at least four major interested parties must be met. Often conflicting interests must be reconciled. Many times we have been called into the picture to help straighten out difficulties where the buyer making his own design thought he had *all* requirements covered.

We know all the "inspection hurdles" and knowing also the processing steps which call for the equipment, we are capable of designing heat transfer units which will not only fulfill operational requirements but will *meet all codes* and *pass all inspections.*

Our suggestion is that, from the beginning, you let us work with your engineers on the design of any kettle, heat exchanger or other equipment you need. You will save time and money.



DESIGN DATA

Size: 60″ o.d. x 102″ over the heads
Nozzles: four 1½″; four 2″; one 3″
Jacket: 64″ o.d., with two 2″ nozzles
Working Pressure: shell 125 pounds; jacket 25 pounds

A 20″ manhole is installed in the side of the shell. Three swirlbreakers are attached to the side of the kettle. The mixing equipment is fitted with a 3″ shaft. The tophead, including a 10″ connection and fast opening cover, is welded to the shell.

THE PATTERSON-KELLEY Company, Inc.

Main Office and Factory 112 WARREN STREET, EAST STROUDSBURG, PA.

BOSTON 16, 96-A Huntington Avenue • NEW YORK 17, 101 Park Avenue • PHILADELPHIA 3, 1700 Walnut Street • CHICAGO 4, Railway Exchange Building

SUPPLIERS SINCE 1838

COCOANUT OIL

Castor Oil
Corn Oil
Cottonseed Oil
Olive Oil and Foots
Peanut Oil
Rapeseed Oil
Sesame Oil
Sunflowerseed Oil
Lard Oil
Neatsfoot Oil
Tallow and Grease
Lanolin and Wool Fat

FATTY ACIDS

Red Oil
Special White Oleine
Stearic Acid
Rufat
Cocoanut F. A.
Corn F. A.
Cottonseed F. A.
Linseed F. A.
Peanut F. A.
Soya F. A.
Tallow F. A.

White Mineral Oil - Petrolatum - Superfatting Agent

VODOL A maize phosphatide which lowers surface and interface tension of oils and fats, stabilizes and prevents reversion, increases penetration and spread.

Soda Ash
Caustic Soda
Modified Soda
Sodium Metasilicate

Trisodium Phosphate
Disodium Phosphate
Monosodium Phosphate
Tetrasodium Pyro Phosphate

THE LAMEPONS unique surface active agents; prolific foam; high detergency and emulsifying powers; suitable for cosmetic and industrial use.

QUADRAFOS a stable polyphosphate for water conditioning and mild but effective detergency.

Starch and Dextrine

WELCH, HOLME & CLARK CO., INC.

563 GREENWICH STREET, NEW YORK 14, N. Y.

grees F. in addition to possessing high resistance to impact.

Two types of glass tanks are being produced by Pittsburgh Plate. One is made entirely of either opaque or transparent glass five-eighths to one and one-fourth inches thick depending on service requirements. The side walls are grooved to take gaskets of impregnated glass cloth at the joints and the tanks are held together by corrosion resistant metal tie rods. The bottom has an inner or secondary lining of Herculite glass. The maximum inside size of such tanks is eight feet long by five feet ten inches wide and five feet deep.

The other type has a one-half inch glass lining inside a steel shell and is used where larger tanks are required. The glass is held away from the outer shell by spacers which are designed to apply pressure on the joints. The space between the glass and the outer shell contains a continuous acid resistant membrane applied by a special process. The theoretical maximum size of glass tanks of this type is limited only by the size in which the glass plates can be made.

Pyrex drains are provided for highly corrosive conditions. Tanks also have been installed with glass hoods for removing fumes and with heating units known as candle heaters. All metal parts of these heating units are enclosed.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (4-5)

Please send me more detailed information on the following new equipment.

QC 538	QC 541	QC 544	QC 547
QC 539	QC 542	QC 545	QC 548
QC 540	QC 543	QC 546	

Name ..... (Position) .....

Company .....

Street .....

City & State .....

Pop Valve QC 543

Farris Engineering Co. announces the development of a pop relief valve which the National Boiler Laboratories, Ohio State University, reports has an exceptionally high coefficient of lift for the disc.

This high lift is secured through the unique design of the valve disc, by which the velocity of the fluid is entrapped and its kinetic force is converted into additional lift for higher relief discharge. The new Farris pop valves (type No. 1800), designed for pressures up to 300 lbs., are already in extensive use on steam, air, gas, water and other liquid process lines. They are made in sizes ½" to 2½" and meet full ASME specifications.

This Farris pop valve is built with

an adjustable single blow-down ring which permits regulation of the amount of pressure to be relieved on individual operations. Economical, minimum blow-down results.

Long, accurately calibrated carbon-steel springs have been incorporated in these new pop valves. They are also available with a hand wheel for easy and accurate pop adjustments on jobs requiring frequent changes of operating pressures, or with packed adjusting bolt under a protecting cap for gas service.

Another new Farris pop valve (Utility type No. 1840), although somewhat smaller, is similar to those described above. However, this type is built without an adjustable blow-down ring, which is replaced by a predetermined orifice. Primarily designed for equipment manufacturers or others requiring low first-cost, this utility valve is made in sizes ⅜" to 1".

Hydraulic Press QC 544

A new 25-ton, self-contained, plain hydraulic press built by The Watson-Stillman Company, Roselle, New Jersey, is a compact, easily operated machine with a wide range of application for general utility work. It is of four-rod construc-

SOME FLAT SHEETS *Plus* WISHFUL THINKING

That's all there was a few days ago when one of our customers asked us if we could fabricate a sanitary heating coil in a hurry... an emergency replacement job that was holding up production.

Nooter knew exactly how. With no tubes available, sheets of stainless steel were welded into tubes, tubes welded into headers—the whole polished off to a sanitary finish—and our customer was back in production in jig time.

DON'T BE PUZZLED next time *you're* up against a perplexing fabrication problem. Just remember—*Nooter knows how to solve the tough ones fast*—can save you plenty of headaches, time and money.

JOHN NOOTER BOILER WORKS CO.

Alloy and Bi-Metal Fabricators

1409 South Second Street • St. Louis 4, Missouri

ARMY ★ NAVY

NOOTER
ST. LOUIS

JARS, TANKS and FILTERS
made from this New
CHEMICAL STONEWARE
ARE STRONG, DENSE AND RESISTANT TO HEAT-SHOCK

To THE general all-around economy and usefulness of "U. S." Chemical Stoneware add these important new qualities: greater mechanical strength, greater density, and a remarkable ability to withstand violent heat-shocks.

Pots, jars and tanks, with or without outlets or covers, as well as other standard items of chemical stoneware equipment such as suction filters, pipe and fittings, laboratory sinks, etc., are now available, made from Ceratherm-500, U. S. Stoneware's new heat-shock resistant chemical stoneware body.

This new chemical stoneware is guaranteed to be acid-and-alkali proof* throughout its entire body. Equipment made from it is far more durable, rugged, and economical in use than standard bodies. Yet it costs but pennies more than ordinary chemical stoneware. Many items available promptly from stock. Write for special catalog today.

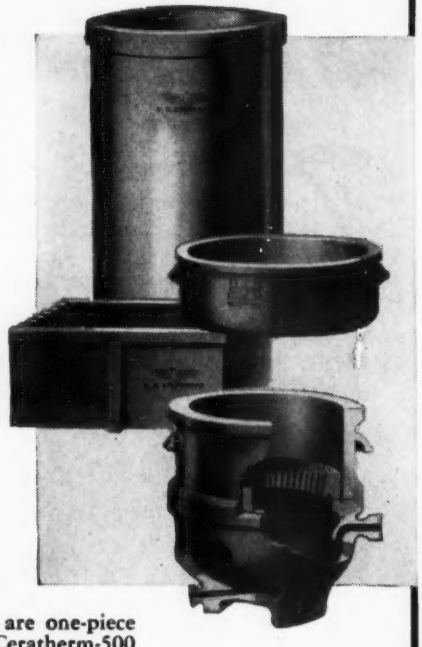
**Except for hydro-fluoric acid or hot caustics.*

CYLINDRICAL POTS
With or without outlets, handles or covers. In capacities from 2½ gallons to 500 gallons.

LOW JARS
With or without outlets, capacities 10 gallon to 60 gallon. Height 10" to 16".

RECTANGULAR TANKS
Standard sizes range from 4 gallons to 320 gallons capacity. On special order available with lugs for a wooden false bottom, or with side bottom outlets.

SUCTION FILTERS
Regularly stocked in five standard types from the small laboratory size to large industrial units, all capable of withstanding a complete vacuum.

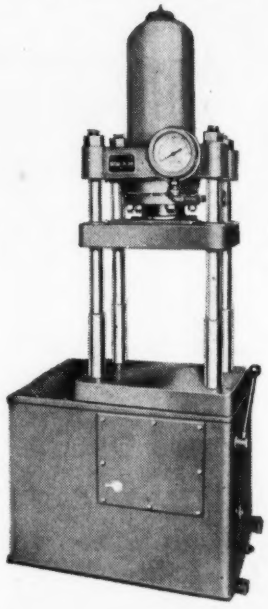


Ceratherm-500 Jars, Pots and Tanks are one-piece construction, with no joints or seams. Ceratherm-500 chemical ware has an attractive, smooth, salt-glaze finish for easy cleaning.

U. S. STONEWARE
AKRON, OHIO

tion with a "moving-down" ram and a double-acting cylinder.

The operating pressure is 1000 p.s.i., 10" stroke, a 15" x 15" platen and 20" daylight opening. The cylinder is 8" diameter and the ram 7¼" diameter. Pressure is supplied by a high and low



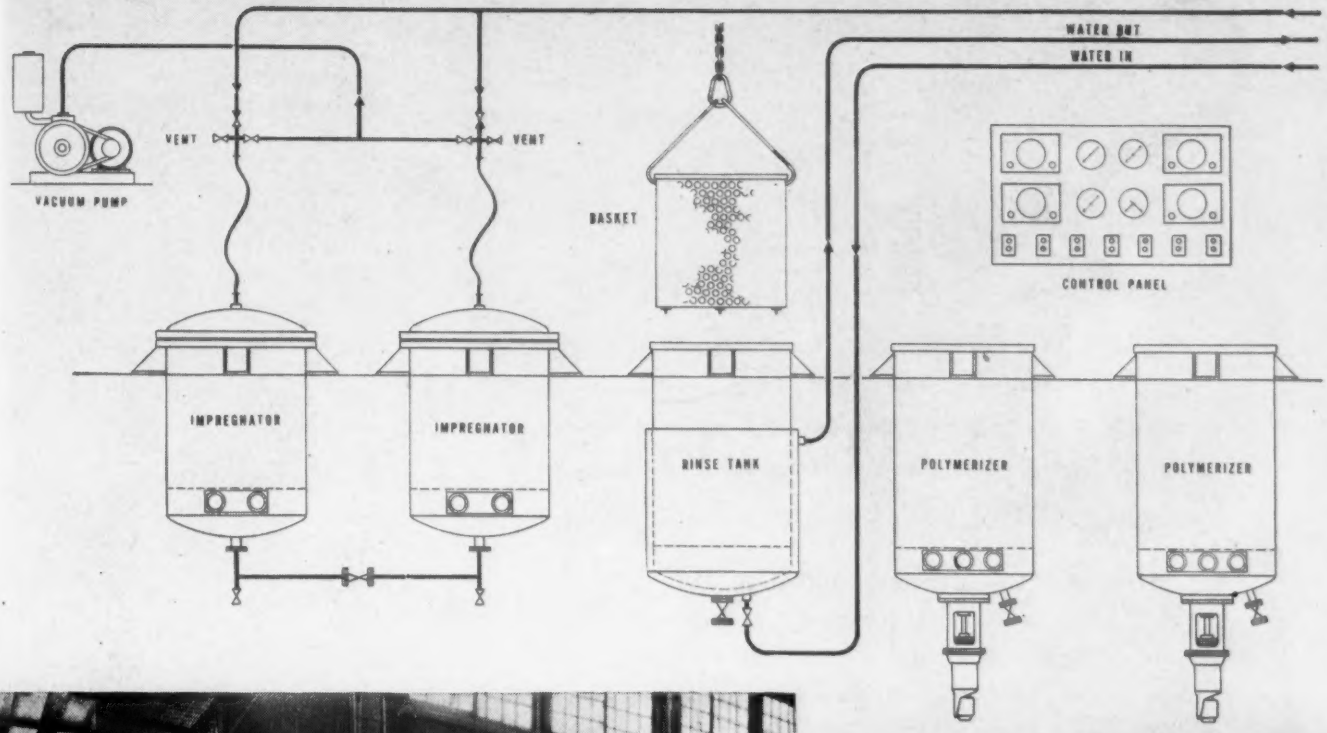
pressure vane-type radial pump direct driven by a 5 hp. motor. Four-way valve control is operated by a single hand-lever to vary load from 15 to 25 tons. Operating speeds: advance, 103" per minute; pressing, 20" per minute; return, 114" per minute.

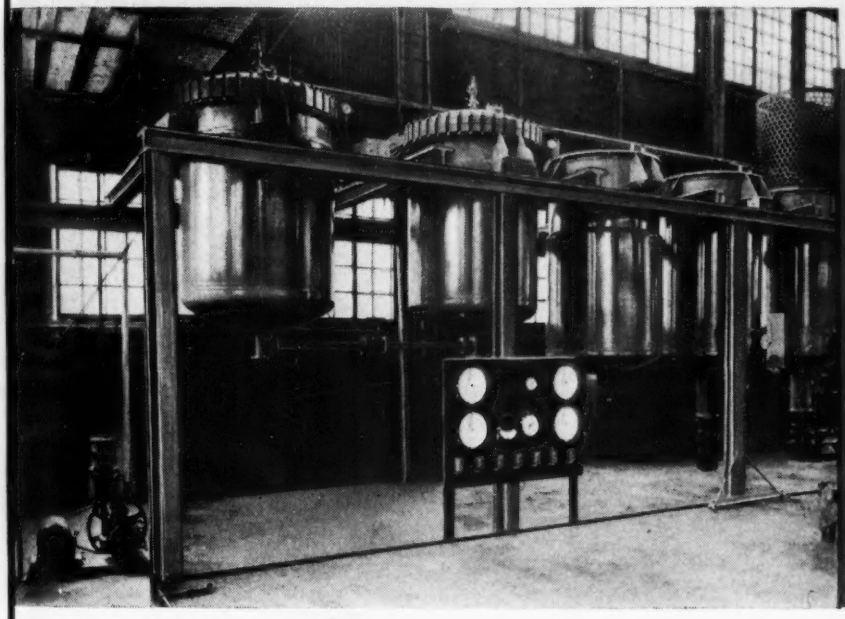
The oil tank and power-plant are located in the base of this press, reducing floor space to 2' by 5'3". It is 7'3" high and weighs approximately 4000 pounds.

Electrode for Welding QC 545

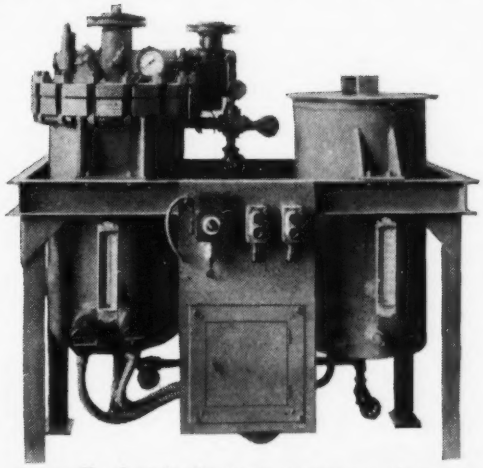
A new heavily covered arc-welding electrode for flat and horizontal fillet

welding as well as for flat butt welding has been announced by the Electric Welding Division of the General Electric Company. The applications of this electrode





VACUUM and PRESSURE IMPREGNATING EQUIPMENT BY BLAW-KNOX



A small electrically heated impregnating unit for either experimental or commercial operation.

The flow diagram and the shop photograph above show a complete plant for the impregnation of magnesium castings with an organic material, rinsing of excess compound and subsequent polymerization within the pores of the castings . . . The experience of Blaw-Knox Engineers in this particular process can be of great help to anyone contemplating a plant of similar type.

BLAW-KNOX DIVISION of BLAW-KNOX CO.
2093 Farmers Bank Bldg., Pittsburgh, Pa.

BLAW-KNOX PROCESS EQUIPMENT

Stop fire with DUGAS EXTINGUISHERS

Charged with PLUS-FIFTY DUGAS Dry Chemical

This is fast-acting protection that is YOUR safeguard against fire loss when you own a DUGAS EXTINGUISHER.

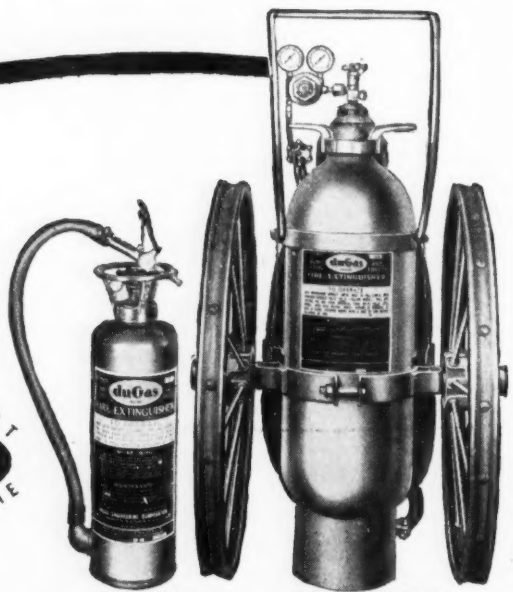
READY FOR ACTION... Dugas units are mobile, easy to handle and simple to operate. They never freeze up in winter; never require periodic recharge . . . yet can be quickly recharged on the spot.

SAFE... the dry chemical rolls up a heat-shielding screen for the operator and at the same time chokes the fire . . . it is non-toxic, non-corrosive, non-abrasive, and is not an electrical conductor.

FOR EXTRA-HAZARDOUS FIRES... in flammable liquids, solids and gases, and in electrical equipment.

Approved by Underwriters' Laboratories, Factory Mutual Laboratories, and Governmental Agencies.

AN ANSUL PRODUCT
duGas
REG. U.S. PAT. OFF.
THE MASTER OF FLAME



DUGAS 15-T HAND EXTINGUISHER

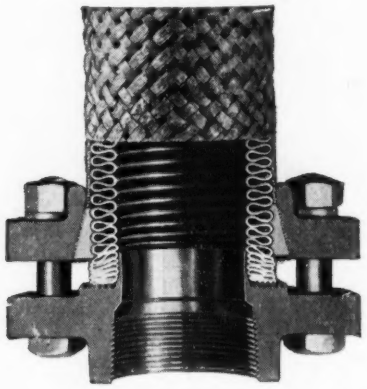
DUGAS 150 WHEELED EXTINGUISHER

ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN
DUGAS DIVISION

include pressure vessels and pertinent connections, heavy machine bases, and structural parts such as column plates, columns, roof trusses, beams, and girders where the thickness of the section permits.

Flange for Metal Hose QC 546

A new detachable flange for helical flexible metal hose, in sizes, 2, 2½ and 3 inch I. D., has been developed by Packless Metal Products Corporation. It is so



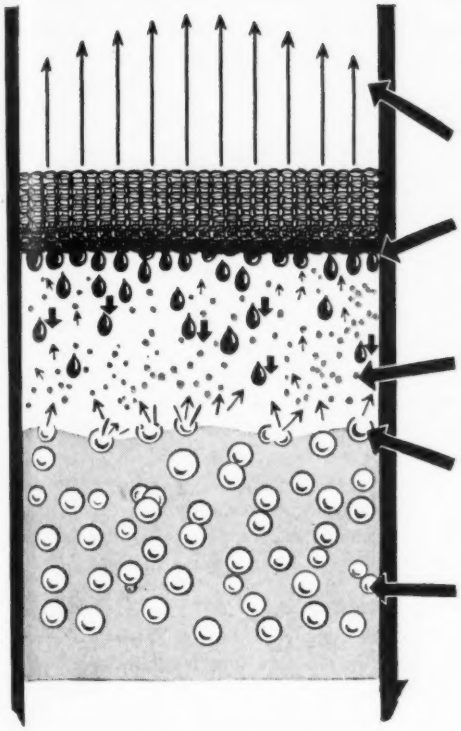
designed as to permit repeated re-use. The assembly operation is simple and time-saving, with ordinary shop tools, no brazing being required. No gasket is employed to connect the flange to the hose, thus making a metal-to-metal seal, ensuring a positive leak-proof installation.

Pumps QC 547

Schneible "Wearproof" pumps, hitherto built in patented relinable horizontal discharge types only, are now available in the vertical discharge model pictured. These pumps were developed originally

for use in connection with Schneible wet-method dust collecting dewatering systems.

The new vertical type is designed for continuous service. The housing is made of abrasion-resistant material, and the



5. The gas continues on entirely free from entrained liquid.

4. The entrained droplets impinge on and are held by the extensive surface of the Metex entrainment separator. As the liquid accumulates drops are formed which when sufficiently large drop off against the flow of the gas.

3. The fine droplets of entrained liquid are carried upward by the gas stream.

2. As the gas phase disengages from the liquid phase, bursting bubbles of gas produce a spray of fine droplets of entrained liquid.

1. A gas phase passes through a liquid phase in distillation, evaporation, absorption, scrubbing, cleaning, humidification, and other gas and liquid operations.

METEX ENTRAINMENT SEPARATORS CAN DO A LOT FOR YOU

In existing equipment Metex entrainment separator permits increased capacity, improved quality of product. In specific cases allows the use of lower grade and less expensive raw materials.

In new equipment, Metex entrainment separator permits more compact, more economical design, and greater all-around efficiency.

Metex all-metal entrainment separators possess over 95% free volume and a tremendous amount of surface area. The large amount of free space accounts for the low pressure drop, which does not exceed a fraction of an inch of water pressure even at high velocities.

The large amount of free space furthermore permits high flow rates without exceeding the capacity of the entrainment separator. For example, water entrainment in air can be completely removed at velocities as high as 600 feet per minute.

For large equipment Metex entrainment separators are fabricated to conform to the exact inside diameter or contour of the equipment; the entrainment separator is furnished in separate strips which are simply passed through the manhole and placed in position; no need for dismantling equipment; no need for skilled labor.

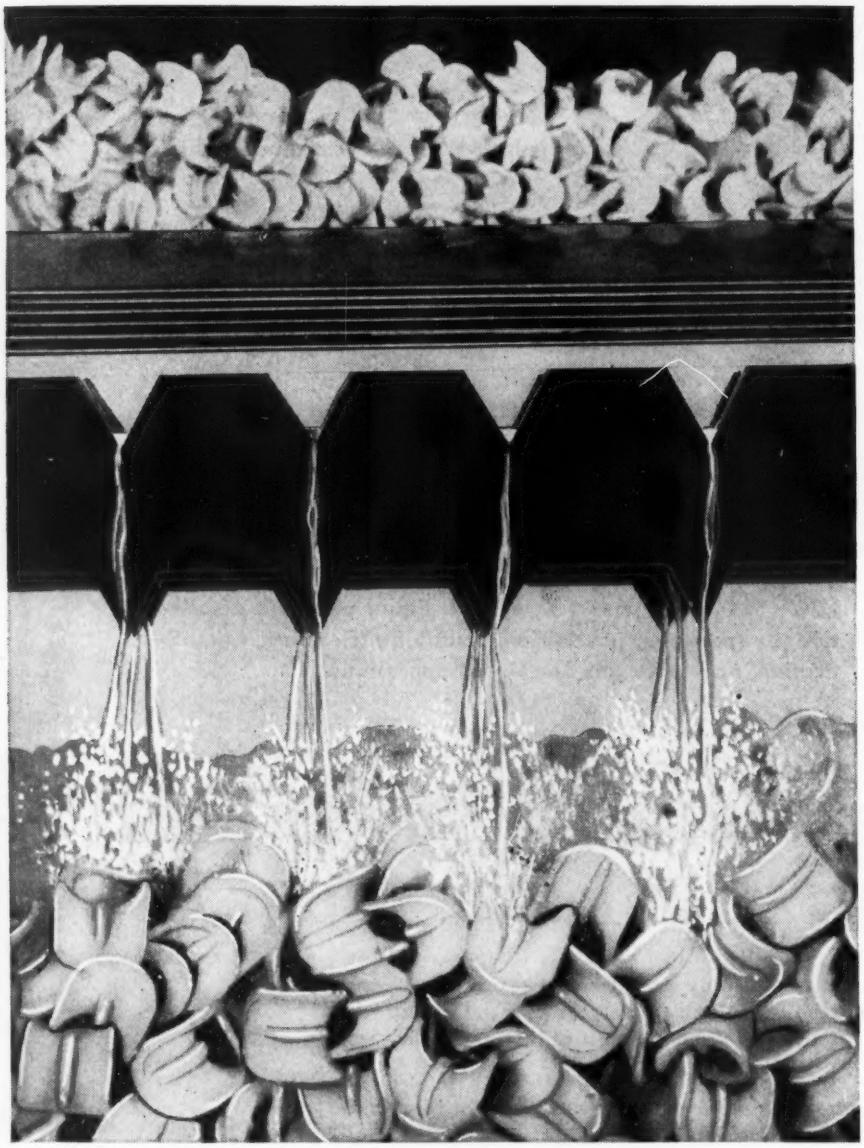
To meet the requirements of corrosive conditions, Metex entrainment separators can be supplied in the following materials: Monel, nickel, Inconel, copper, steel, cupro-nickel, aluminum, stainless steel.

Our engineering department will welcome your inquiry.

METAL TEXTILE CORPORATION

4 Central Avenue West Orange, New Jersey

METEX Products



BERL SADDLES Provide
Maximum Capacity, Better Operation

Large effective surface area
Low resistance to flow
Wide angle distribution
Large open volume
Corrosion-proof

With Berl Saddles in your distillation columns, absorption towers, extraction columns or gas scrubbers, you are assured of maximum capacity and better operation. The illustration above shows heart of a fume washer with 1" Berl Saddles below and V-Weir type distributor. The ½" Berl Saddles above act as a mist eliminator. Berl Saddles are available in ½", 1" and 1½" sizes of chemical stoneware or porcelain material.

MAURICE A. KNIGHT, 204 Kelly Ave., Akron 9, Ohio

KNIGHT-WARE
CHEMICAL EQUIPMENT
MAURICE A. KNIGHT AKRON CHEMICAL STONEWARE

housing top or cover is designed to serve as a strainer. The drive shaft is totally enclosed and is protected by a quill tube which serves as a structural member and is secured to the mounting plate and the housing top. The drive shaft is slotted at the lower end and the one-piece, wear-resistant impeller blade is inserted in this slot and riveted in place, the shaft being connected to the motor with a flexible coupling.

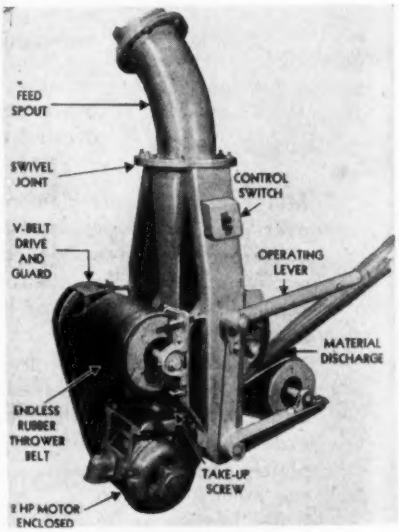
The impeller is readily accessible and the bottom of the pump housing is easily removed for the replacement of wearing parts. A venturi type discharge assures constant head pressure. The pipe is connected to side discharge and carried upward. Discharge is readily changed to any of four positions. The inverted inlet eliminates gas binding and causes the hydraulic thrust to counterbalance the weight of the revolving parts.

Box-Car Loader QC 548

The Stephens-Adamson Swiveloader is used for loading and trimming box cars with loose, granular, bulk materials.

A short, endless thrower belt operates at high speed and material falling upon it from the feed spout, quickly attains the speed of the belt. Material is discharged from the belt by centrifugal force and is thrown in a stream in any desired direction. Trajectory of thrown material and, consequently distance thrown, can be regulated by an operating lever while loader is in operation.

The Swiveloader is furnished complete



with thrower unit, feed spout, and mounting arrangements. Thrower unit is easily swung into position inside of car door, thus eliminating need for a gangplank. The swivel joint between the thrower unit and feed spout allows the loader to be directed toward any part of the car.

This automatic loading unit is completely dust-tight up to the point where the stream of material emerges from the thrower belt and the operator is not required to be in the car.

KILL TOUGH FIRES BEFORE THEY GROW—WITH KIDDE EQUIPMENT

WHEN tough fires spring up—the fast-moving ones that break out in flammable liquids (Class B); the hard-to-get-at kind that start in electrical equipment (Class C)—the Kidde portable or hose reel system acts fast to knock them down—and *out*!

Ordinary water-type extinguishers can't control these tough fires. But the Kidde portable shoots out a cloud of carbon dioxide gas, forming a heavy blanket that smothers the flames. Then the dry, inert, non-toxic gas merely evaporates...leaving valuable liquids *uncontaminated*, electrical equipment *undamaged*. This Kidde method is recognized as one of the speediest, cleanest and safest fire-fighters in use today.

It's smart to check on tough fire areas in your own plant. Does the accompanying list of typical hazards suggest places that still need safeguarding? If it does, call in a Kidde representative—you'll find him wise when it comes to fire protection. Drop us a line.

Kidde Kills Tough Fires

- PROCESS ROOMS
- MIXING TANKS
- AGITATORS
- PUMP ROOMS
- STORAGE AREAS
- DRUM-FILLING ROOMS
- MOTORS
- TRANSFORMERS
- ELECTRICAL CONTROL PANELS

The word "Kidde" and the Kidde seal are trademarks of Walter Kidde & Company, Inc.

Walter Kidde & Company, Inc. • 140 Cedar Street • New York 6, N. Y.

PACKAGING & SHIPPING

by T. PAT CALLAHAN

Box-Car Demurrage Reinstated by ICC

Effective April 1, Order No. 242 of the Interstate Commerce Commission providing heavy demurrage charges for box-cars was reinstated. This order was in effect from October 19 to December 1 of last year.

T. Pat Callahan

This move is designed to speed the loading and unloading of cars, relieving to some extent the burden on insufficient railroad equipment.

The order provides for the following demurrage charges after the free time allowed by railroad tariffs: $2.50 per car per day for the first two days; $5.50 for the third day; $11 for the fourth day; and $16.50 for each succeeding day.

The order will be in effect until October 1 unless it is rescinded before that time.

Express Shipment of Dangerous Materials

The Interstate Commerce Commission Regulations for transportation by rail differentiates between packing and shipping by rail freight, express, and baggage. Certain hazardous articles which are permissible by rail freight are not permissible in express or baggage transportation; and the quantities of certain articles permitted to be shipped by express which may be packed in one outside package are limited. There is a very definite reason for this and it is well for shippers to be acquainted with the reasons.

As we all know, express transportation differs greatly from rail transportation in that the commodities handled by express are loaded in conjunction with passenger transportation, as in the case of an express car being attached to a passenger train. This means that the loading and handling takes place at stations wherein passengers are present, and the hazards incident to this handling are greater than when commodities are handled in the usual freight stations. Consequently, the rules for express movement must be more stringent than for rail movement. By referring to the Commodities List, which is made a part of the Interstate Commerce Commission Regulations, shippers may find out to what extent and to what amount hazardous chemicals may be shipped by express.

Take, for example, corrosive liquids: In most cases the maximum amount which may be packed in one outside package to be shipped by American Express runs between one quart and ten pints, whereas most of these may be shipped by rail freight in quantities up to 110-gallon drums. Inflammable liquids are likewise restricted, and as one looks through the Commodities List, he will find that in a great many instances the maximum quantity may be packed in one outside package is 10 gallons.

As we mentioned, many hazardous commodities are not acceptable by express. It is the duty of all shippers, in the interests of safe transportation, to acquaint themselves with the provisions of the Interstate Commerce Commission Regulations governing movement by express so that the fine record already established will continue. It is only through continuous adherence to the Regulations that we can continue to transport dangerous chemicals safely.

Demurrage Order Amended

Revised Service Order 263, Demurrage Charges on Tank Cars, was further amended by Amendment No. 2 issued on February 10, 1945. Of particular interest to those unloading tank cars is section (b) of this order which adds to the list of cars subject to the increased demurrage the designations "TP," which means "tank pressure," and "TPI," which means "tank pressure insulated." This amendment does not affect "TP" and "TPI" when these cars are loaded with anhydrous hydrofluoric acid, carbon dioxide, chlorine, ethyl chloride, ethylene oxide, metallic sodium, methyl chloride, suphur dioxide or motor fuel anti-knock compound.

Amendment No. 2 vacates and supersedes Amendment No. 1 and becomes effective at 7:00 a. m., February 22, 1945.

Packaging Committee

Announcement that the Quartermaster Corps has asked the Technical Committee of Packaging Institute to serve as the Industry Advisory Committee for its Subsistence and Development Laboratory, was made by Walton D. Lynch, President of the Institute.

The request for the services of the Committee was made by Major Robert R. Melson, of the Subsistence and Development Laboratory, Chicago Quartermaster Depot. Mr. Charles A. Southwick, Jr., Chairman of the Technical Committee, reported that the functioning of the committee, and method of operation had been agreed upon, and that work had already been started on packaging projects submitted by the Quartermaster Corps.

Steel Drum Committee

Establishment of a New Steel Drum Industry Advisory Committee was announced on February 14, 1945, by the Office of Price Administration.

The committee, composed of fourteen executives in the new steel drum, pail and container industry, held its first meeting on February 19 and 20, 1945, in Washington, D. C.

Purpose of the meeting was to discuss pricing problems in the new drum field, including the effect on manufacturing costs of the $2 per net ton ceiling price increase for hot-rolled carbon steel sheets which became effective January 11 of this year.

New steel drums, pails and steel containers are priced under the General Maximum Price Regulation, and ceilings are the highest prices individual sellers charged during March, 1942.

These are the members of the committee:

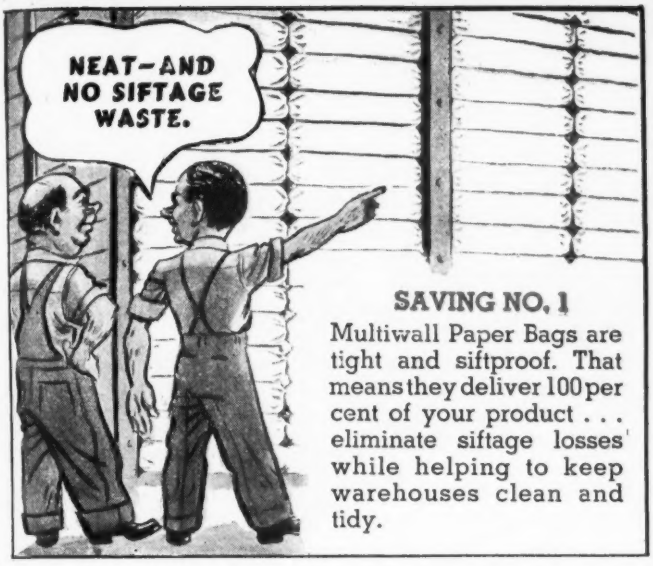
F. H. Alger, Stevens Metal Products Co., Niles, Ohio; R. L. Brammer, Wheeling Corrugating Co., Wheeling, West Va.; J. A. Connelly, U. S. Steel Products Co., Sharon, Pa.; C. B. Coons, Rheem Manufacturing Co., New York, New York; H. W. Lees, J. and L. Steel Barrel Co., Cleveland, Ohio; D. F. Manion, Jr., Manion Steel Barrel Co., Rouseville, Pa.; J. W. McIntire, Southern States Iron Roofing Co., Savannah, Ga.; R. Sidney Dry, National Steel Container Co., Chicago, Ill.; Paul Gaylord, Virginia Barrel Co., Staten Island, New York, N. Y.; J. T. Gossett, Inland Steel Container Co., Chicago, Ill.; Theodore Humphrey, Niles Steel Products Division, Republic Steel Corp., Niles, Ohio; G. A. Sexton, Sexton Can Co., Everett, Mass.; Thomas M. Stinson, Steel Drum Division, National Enameling & Stamping Co., Granite City, Ill.; H. P. Thelen, Continental Can Company, New York, New York.

ICC Drum Specifications

Continuing our discussion on ICC specification metal barrels and drums, we come to the Specification ICC 17 series drums which consists of the 17C, 17E, 17F and 17X drums. This series consists of all non-returnable containers which, except for the present emergency, cannot be reused for the shipment of dangerous articles. It must be borne in mind, however, that during the emergency, by spe-

Check these Savings

AGAINST YOUR PRESENT PACKAGING METHOD



SAVING NO. 1
Multiwall Paper Bags are tight and siftproof. That means they deliver 100 per cent of your product . . . eliminate siftage losses while helping to keep warehouses clean and tidy.

SAVING NO. 2—Multiwalls save materials! This is because materials do not readily cling to the smooth interior surfaces of Multiwall bags. These bags empty clean, thus cutting retention losses.

SAVING NO. 3—Multiwalls prevent losses caused by contamination. Your product flows directly to the bag packing machine where the bags are filled and weighed automatically. Tight, strong Multiwalls repel dampness, dust, insects, and contaminating gases.

SAVING NO. 4—Multiwalls help conserve manpower and thus reduce labor costs. Experiments have shown that *one man* can load and stack Multiwall Paper Bags as fast as *two men* can handle comparable tonnage in heavy fabric sacks or drums.

MULTIWALLS are tough and sturdy, too. Made of from 2 to 6 plies of special kraft paper, they will be specially designed to meet specific conditions involving excessive dampness and rough handling.

So, if you are not already using Multiwall Paper Bags, why not find out how they can save money, minutes, and material. Your inquiry will receive prompt and careful attention. Write today.

St. Regis MULTIWALL PAPER BAGS

MULTIPLY PROTECTION • MULTIPLY SALEABILITY

ST. REGIS PAPER COMPANY

TAGGART CORPORATION

NEW YORK 17: 230 Park Ave. CHICAGO 1: 230 No. Michigan Ave.
BALTIMORE 2: 2601 O'Sullivan Bldg. SAN FRANCISCO 4: 1 Montgomery St.

IN CANADA:
St. Regis Paper Co. (Can.) Ltd.
Montreal, Quebec
Vancouver, British Columbia

Boston, Mass. Birmingham, Ala. Dallas, Tex. Denver, Colo. No. Kansas City, Mo. Los Angeles, Calif.
New Orleans, La. Franklin, Va. Seattle, Wash. Nazareth, Pa. Toledo, Ohio

cial permission of the Interstate Commerce Commission and approval by the Bureau of Explosives, when certain conditions are met, these drums may be reused for more than one shipment.

The most commonly used steel drum in the chemical industry is included in this series; this is the Specification ICC 17E drum which was formerly designated by the Interstate Commerce Commission as the ICC 5E drum. In that the 17E is the most commonly used drum, we shall discuss this first and follow with the ICC 17C, ICC 17F and ICC 17X.

The ICC 17E container must comply with ICC Specification 5A except as follows: Head and chime seams do not have to be welded or double-seamed; flanges for the closures do not have to be welded in place; the chimes do not have to be reinforced; the gauge of metal, depending on the size of the drum, ranges from 24 gauge for the 5-gallon size to 18 gauge for the 55-gallon drum. The latter is the largest which can be constructed under this specification. Convex heads are required as follows:

"*Convex heads:*—Convex (crowned) heads, not extending beyond level of chime, required for drums of 25 gallons capacity or over; minimum convexity 5/8" for capacity 25 to 35 gallons, inclusive, and 3/4" for larger drum. Convexity of 3/8" authorized for drums made of 18 gauge material throughout."

When threaded closures are used, the following must be complied with:

"For closure with threaded plug or cap, the seat (flange, etc.) for plug, or cap, must have 3 or more complete threads; two drainage holes of not over 5/16" diameter are allowed. Plug, or cap, must have sufficient length of thread to engage 3 threads when screwed home with gasket in place."

Removable head containers which will pass all the required tests are authorized under this specification.

Certain tests must be complied with which are as follows:

"Test by dropping, filled with water to 98 per cent capacity, from height of 4 feet onto solid concrete so as to strike diagonally on chime, or when without chime seam, to strike on other circumferential seam; also additional drop test on any other parts which might be considered weaker than the chime. Closing devices and other parts projecting beyond chime or rolling hoops must also be capable of withstanding this test.

"Hydrostatic pressure test of 15 pounds per square inch sustained for 5 minutes.

"*Leakage test:*—Each container shall be tested with seams under water or covered with soapsuds or heavy oil, by interior air pressure of at least 7 pounds per square inch for containers over 12 gallons capacity and at least 5 pounds for others; leakers shall be rejected or repaired and retested; removable head containers not required to be tested with heads in place except that samples taken at random and closed as for use, of each type and size, must be tested at start of production and repeated every four months; samples so tested must be retained until further tests are made."

The use of the ICC 17E drum in the chemical industry has increased greatly during recent years on account of various changes in the Interstate Commerce Commission Regulations permitting the use of inflammables and poisons in ICC 17E drums which were formerly shipped in the heavier returnable ICC 5 and 5B drums. As the ICC 17E drum is a non-returnable container in normal times, its use in place of the heavier returnable type drum eliminates a great many difficulties encountered in the handling of returnable drums. It is felt that with the return to normalcy, the ICC 17E drum will definitely replace the heavier returnable type drums in the majority of shipments in the category of inflammables and poisonous materials.

The ICC 17C drum differs from the ICC 17E drum in that it is of heavier construction, being approximately two gauges heavier for the different sizes than the ICC 17E drum, and the tests are more severe. The test by dropping is the same, but the hydrostatic pressure test is 40 lbs. per square inch sustained for 5 minutes for the ICC 17C drum, and 15 lbs. per square inch sustained for 5 minutes for the ICC 17E. The leakage test requires testing with seams under water or covered with soapsuds or heavy oil by interior air pressure of at least 15 lbs. per square inch for the ICC 17C and this differs from the ICC 17E in that each container shall be tested with seams under water or covered with soapsuds or heavy oil by interior air pressure of at least 7 lbs. per square inch for containers over 13 gallons capacity and at least 5 lbs. for others.

The general use of the ICC 17C drum may be found in the shipment of very highly inflammable material, one of which is carbon bisulfide.

The ICC 17F is a special drum which must be manufactured of 16 gauge material regardless of size up to 55 gallons. This drum was placed in the Regulations specifically as a single-trip container for sulfuric acid, and its use for this product is regulated as follows:

"Spec. 17F.—Metal barrels or drums (single trip) only for acid of 1.81 specific gravity (65° Baumé) or greater strength or when the strength of the

DOW chemicals available for prompt delivery

Monoethanolamine

A hard-working chemical today, Monoethanolamine can very likely serve you in still newer ways. As an emulsifying, saponifying, and neutralizing agent, it has attained wide use in cleaning agents, removing hydrogen sulphide from sour gases, and the purification and recovery of carbon dioxide.

Monoethanolamine is also employed extensively as a chemical intermediate. It is a base of approximately the same strength as ammonia . . . enters into reactions characteristic of both alcohols and amines. With acids it forms soaps or salts of varying solubility in water and organic solvents.

Dow is prepared to cooperate in developing new uses for this promising compound. Commercial quantities are available for essential end uses, and samples can be supplied for investigational work. Your inquiries are invited.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

Anopheles punctulatus
malaria-carrying mosquito

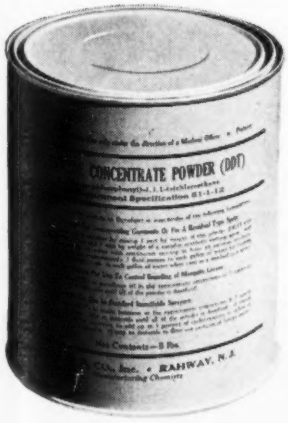
Pediculus humanus (female)
typhus-bearing louse

Crown Cans

guard conqueror of disease-bearing pests!

IN the development of DDT, destroyer of the malaria-carrying mosquito and the typhus-bearing louse, scientists see a day when the earth will be forever rid of two scourges that have recurrently decimated populations since time immemorial.

Merck & Co., Inc., of Rahway, N. J., who manufacture it for the U. S. Navy, take the precaution to package this new wonder insecticide in Crown cans. For, despite the rigors of many handlings and widely varying climatic conditions incident to the thousands of miles this vital chemical must travel, Crown cans assure its complete protection . . . the retention of full strength . . . thus preserving the lethal qualities of DDT ready for lifesaving service in pestilence-endangered areas throughout the world.



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INDEPENDENT AND HELPFUL

CROWN CAN COMPANY • NEW YORK • PHILADELPHIA
Division of Crown Cork and Seal Company, Baltimore, Mary.and

Have you tried
TETRAHYDROFURFURYL ALCOHOL
for dissolving "insoluble" complex organics?

Many chemists have found that Tetrahydrofurfuryl Alcohol will dissolve those complex organic substances that are not touched by many other of the commonly used solvents. In the textile and dye fields, the use of Tetrahydrofurfuryl Alcohol is growing because of the ability of this chemical to dissolve many of the new organic dyes. It is also filling a specific need in lacquers and special coating compositions where solvent costs are not of primary consideration.

The dispersant qualities of this alcohol for chlorinated rubber, vinyl resin, nitrocellulose, shellac, benzyl cellulose, polyhydric alcohol, polybasic acid resin, rosin and estergum suggest it may provide the answer where a special solvent is indicated.

OTHER USES OF
Tetrahydrofurfuryl Alcohol

While but recently made available in commercial quantities, the literature on Tetrahydrofurfuryl Alcohol indicates its versatility and usefulness in many processes and reactions.

Wetting Agent: It has been used alone or in mixtures with soap, trichloroethylene, or sulfonated lauryl alcohol as wetting, washing, and cleansing agents for textiles, raw wool and tanned sheepskins. **Plasticizers:** Tetrahydrofurfuryl Alcohol converts into esters and other derivatives easily, forming excellent plasticizers. The use of these plasticizers for conditioning cellulose derivative yarns is said to result in increased softness and pliability. This versatile chemical also reacts with terpinene maleic anhydride, maleic and phthalic anhydrides. Improvement of the wet strength of regenerated cellulose articles is effected with the addition of Tetrahydrofurfuryl Alcohol. Softening and elasticity are also reported as resulting from the use of Tetrahydrofurfuryl Alcohol with gelatin, casein and albumen compositions.

If you would like to try Tetrahydrofurfuryl Alcohol in your operations, you can count on the help of our Technical Staff in evaluating its performance.

Quaker

TETRAHYDROFURFURYL ALCOHOL
(TECHNICAL)

$C_4H_7O-CH_2OH$

Mobile liquid, water white to pale yellow in color.

Molecular Weight	102.13
Boiling Range, °C (99%)	170 to 180
Specific Gravity (25/25°C)	1.052
Flash Point (open cup) °C	75
Refractive Index (25/D)	1.4502
Surface Tension (Dynes/cm)	36.5
Viscosity at 25°C (centipoises)	5.49

SHIPPING INFORMATION

Standard Containers: 8, 40, 80, and 475 lb. Drums (net).
Carload of drums (80) ..... 38,000 lbs.
F.O.B. Waverly, New York, except less drum lots F.O.B. Cedar Rapids, Iowa.

FURFURAL is a liquid aldehyde, minimum 99.5% C_4H_3O-CHO. It has proved highly efficient in the production of aviation lubricants, synthetic rubber, wood resins, phenolic resins, abrasives and grinding wheels, glyceride oil separations, tall oil processing, vitamin oil refining, photo-sensitive resins, fungicides, bactericides, and preservatives, and as a pharmaceutical intermediate, solvent for coatings, esters, gums, textile and shoe dyes, and cleaners.

The Quaker Oats Company — **CHEMICALS DEPT.**
1920 BOARD OF TRADE BLDG.
141 W. JACKSON BOULEVARD, CHICAGO 4, ILL.

FURFURAL • FURFURYL ALCOHOL • HYDROFURAMIDE • TETRAHYDROFURFURYL ALCOHOL

acid is 60-65° Baumé and the acid has been treated with an inhibitor that renders its corrosive effect on steel no greater than 66° Baumé commercial sulfuric acid."

The ICC 17X drum is a specially constructed drum which does not meet the requirements of the ICC 17E drum in all respects and was put into the Regulations in order to legalize the shipment of various materials in inter-state transportation which eventually were exported. This regulation is similar to the Specification MIN-W20 of the Bureau of Marine Inspection and Navigation. The chemical industry in general has used the standard ICC 17E drum, but for certain petroleum products the ICC 17X has been used.

L-197 Interpreted

On February 17 the War Production Board gave the following interpretation of L-197:

"Paragraph (d) (1) of Order L-197 provides a special alternative quota for the first quarter of 1945 with respect to each class of commodities listed in Schedule A for filling of industrial orders. That alternative quota is an amount of tonnage of new steel drums equal to the amount of tonnage of new steel drums permitted as the quota for the fourth quarter of 1944 (including tonnage increases to that quota authorized during that quarter, but excluding drums permitted to be used to pack the commodities listed in Schedule B). The amount of this tonnage shall not include any unused tonnage of a third quarter 1944 quota permitted to be used in the fourth quarter of 1944 or any tonnage of a first quarter 1945 quota permitted to be borrowed and used in the fourth quarter of 1944 or any tonnage covering the quantity of new steel drums (representing a percentage of fibre drums used in 1943) permitted to be used in the fourth quarter of 1944 in addition to that quarter's quota. However, regardless of whether the above special alternative quota is used, a person may, during the first quarter, use in addition to his quota whatever tonnage is left over from his fourth quarter quota and all or part of his 1945 permitted quantity of drums covering the specified percentage of fibre drums used in 1943, but a person must deduct from his first quarter quota any tonnage he borrowed from his first quarter quota and used in the fourth quarter of 1944."

It is necessary to understand this interpretation as quotas of new steel drums for the ensuing quarter will most likely be based on the quota established for the first quarter of 1945.

"The bigger the family—the better the service"

THAT'S TRUE of businesses as well as families! Continental's family offers you technical skill, varied experience, extensive resources and facilities. This combination guarantees you complete service and the ideal package for your product.

Our packaging experts and engineers will analyze your problem impartially. Our great variety of containers assures you of the very one you want.

We make all kinds of packages now—metal containers, liquid-tight paper containers and cups, fibre cans and drums, steel pails and other heavy-duty containers.

Right now we're busy serving Uncle Sam. But keep your eye on Continental! And on Continental's trademark, too. The Triple-C stands for *one* company with *one* policy—to give you only the very best in quality and service.

Tune in: "REPORT TO THE NATION" *every Saturday over coast-to-coast CBS network*

CONTINENTAL CAN COMPANY, INC.

PAPER DIVISION

FIBRE DRUMS The Container Co., Van Wert, Ohio

LIQUID-TIGHT FOOD CONTAINERS Boothby Fibre Can Co. Roxbury, Mass.

PAPER CUPS Mono Containers, Newark, N. J.

COMBINATION PAPER AND METAL CONTAINERS

Headquarters: 330 W. 42d St., New York 18, N. Y.

13 Plants—Sales offices in all principal cities

Continental Fibre Drums—Continental has a full line for shipping dry products, resins, rosins, asphalt, grease and other semi-liquids. Continental Special drums range from 10 to 65 gals. "Fiberpak" drums (illustrated) from ¼ gal. to 67 gals.; "Stapak" drums from 2 to 32 gal.; "Leverpak" drums from 12 to 75 gal. cap.

PLANT OPERATIONS NOTEBOOK

Jail for Defective Tools

A novel way of calling attention to unsafe tools is noted in a recent issue of the DuPont Company's *"Chambers Works News."*

During routine inspections any unsafe tools, such as a hammer with a loose head, a shovel with a ragged edge, or any other unsafe tool, is tagged with the name of the building in which it is found and tossed into the "clink." A

repair order must be presented to "bail out" the defective tool. If it is beyond repair, the sentence is "life imprisonment."

It is the aim of the workers to keep the "jail" empty of "jailbirds" from their respective buildings by turning in all defective tools to their foreman's office to prevent arrests.

This safety stunt not only serves the practical purpose of eliminating unsafe implements, but acts as a reminder that "these jailbirds can injure you when on the loose, and in use."

Testing of Welded Seams

A new, fast and simple method has been developed for testing welded seams on steel tanks that must be absolutely tight.

Formerly air pressure was applied or the tanks were filled with water—both slow and inconclusive. Now it is possible to spray a thin film of Kano Kroil along the seams and even in the most minute openings it quickly penetrates to the opposite side of the seam.

Kano Kroil is a creeping, penetrating chemical with an extremely low surface tension so it spreads and creeps rapidly. It literally goes everywhere, quickly. Laboratory tests have shown that it penetrates a millionth-inch space. It is a product of Kano Laboratories.

Prevention of Dust Explosions

According to a recent Bureau of Mines publication, the fundamentals for prevention of all dust explosions are essentially the same, although all dusts have quite different explosive characteristics. Good housekeeping and properly designed and installed dust-collecting equipment are the most important preventives.

The report describes the behavior and factors affecting the inflammability and explosibility of metallic and carbonaceous dusts, and synthetic resin powders. Corn starch, the majority of powders used in the plastics industry, and aluminum, magnesium, and zirconium powders are classified as being particularly hazardous. In the testing of metal powders a number of ignitions were obtained at room temperature without any outside source of heat or flame when a quantity of finely divided powder was blown into the air. The ignitions were believed to be due to static electricity on the dust particles.

Other suggestions made by the author, Mr. Hylton R. Brown, are the prohibition of the use of flames whenever dust-producing machinery is in operation, use of special electrical equipment designed for dusty industries, grounding of all places where charges of static electricity might collect, and proper design to minimize damage should an explosion occur.

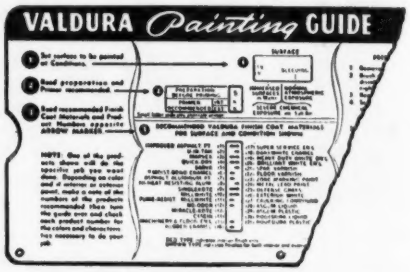
The publication, I. C. 7309, "Industrial Dust Explosions," was issued by the Bureau of Mines, Department of the Interior, Washington 25, D. C.

Painting Guide

A new handy method of selecting the best paint for a given application without detailed technical knowledge of different finishes is provided by the Valdura Paint Guide offered to Industrial Maintenance Engineers by the American-Marietta Company. The Guide makes conveniently available all information on properties of, and all application data necessary to choose properly from the Valdura Line maintenance paints.

It is of convenient pocket size and works on the principle of a slide rule and with only two settings gives the correct surface preparation, the proper priming and finishing coats.

Information is furnished as to the resistance of the recommended material to heat, acid, alkali, moisture, abrasion, sun and oil. Coverage and drying time data



are also furnished. The Guide shows the proper thinner to use as well as the correct proportion.

Safety Chart Series Available

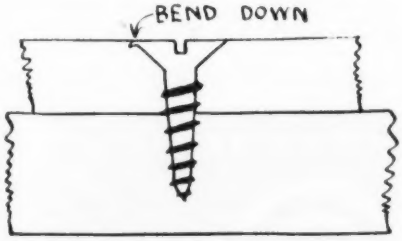
The Division of Labor Standards of the U. S. Department of Labor is issuing a series of Industrial Safety Charts, which are designed to promote safe working practices around the common types of industrial equipment. The first of the series is on drill presses, and subsequent issues, which will be published monthly, will cover circular saws, power trucks, and other types of industrial equipment.

These charts may be obtained by purchase from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., or from Mill and Factory, 205 E. 42nd Street, New York 17, N. Y.

Anchoring Wood Screws

When pieces of wood, subjected to constant vibration and strain, are joined by screws, it is not uncommon for the screws to work loose and come out.

One of the better and simpler preventives is to bend down the edge of the head with a cold chisel in the manner shown in the accompanying sketch. The portion which is bent down will then serve



as a brake or a lock, making it difficult to remove, even with a screw driver. Obviously, it is better to make the bend where the bent portion must move "against" rather than "with" the grain of the wood.

IMPORTANT ANNOUNCEMENT

Pennsylvania Salt Manufacturing Company now has facilities for the production of

D.D.T.

(dichloro-diphenyl-trichloroethane)

The record of D.D.T. in Italy—where it controlled the spread of louse-born typhus for the first time in history—makes it evident that this insecticide has definite postwar possibilities.

Therefore, while producing D.D.T. for war uses, Penn Salt's Research and Development Department at Whitemarsh Research Laboratories is making extensive explorations for the future possibilities of D.D.T.

Although by far the greater part of our production is going to the military, the War Production Board has released a limited quantity of Penn Salt D.D.T. for agricultural and other civilian experimentation and for research directed toward development for commercial uses for this chemical.

If you are interested in the use of D.D.T. in agriculture, and can carry out work under supervision of experienced investigators, contact Penn Salt Agricultural Chemicals Division regarding availability of D.D.T.

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MANUFACTURING COMPANY
Chemicals

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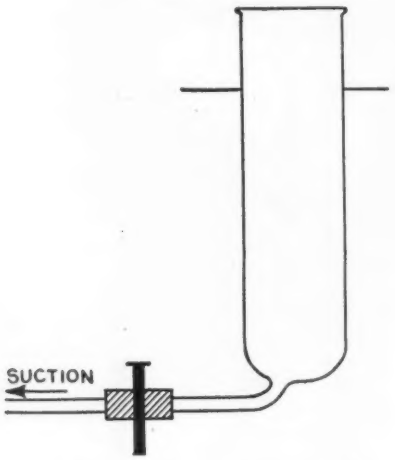
LABORATORY NOTEBOOK

Speedier Colorimeter Reading

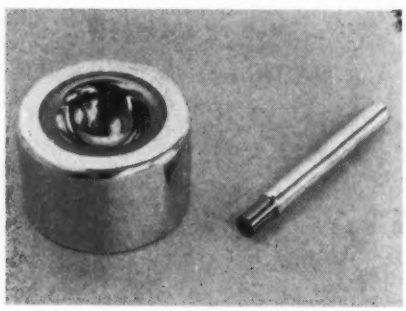
A gadget for increasing the speed of colorimeter reading has been found useful in many laboratories. A single tube is clamped into position in the instrument.



An outlet at the bottom is connected to a water pump with a pinch-clamp in between. After a reading has been made, the clamp is open and the contents are whisked out. Upon closing the clamp, the next sample may be poured in. The arrangement is especially convenient in the measurement of turbidity in large numbers of bacterial tubes. At any rate, the calibration of tubes is eliminated. In most cases, rinsing of the tube between readings is unnecessary.

Boron Carbide Equipment

The New England Carbide Tool Company, 60 Brookline Street, Cambridge 39, Massachusetts, has recently made a contribution to the chemical field by developing and manufacturing mortars and pestles



which cannot become contaminated. The mortar is constructed with a steel body and is lined with a boron carbide insert which is ground to the proper shape and then polished to a mirror finish. The pestle has a steel handle with a polished boron carbide rod mounted at one end.

Boron carbide is the hardest commercial material ever made by man. This material is non-metallic. It cannot charge, and, therefore, it will not pick up lint, dust, or metal particles which might contaminate the materials being ground. The mirror surfaces are so smooth that pit marks or surface irregularities are eliminated, and both the mortar and pestle can be made sterile clean after use.

These mortars and pestles have been used in large scientific research laboratories for over six months with absolutely no signs of wear or contamination in any experiments.

Bottle Salvage Hint

Chemists and technicians who frequently require small, narrow-necked, hard-to-get bottles will be interested in a salvaging hint recently appearing in the *Dental Survey*. Here it is suggested that dirty, small-necked bottles can be cleaned quickly by using copper-plated BB shot. The shot is placed in the bottle together with some powdered soap and warm water and shaken thoroughly until the bottle is clean.

Another method uses the same principle for cleaning larger bottles. A short length of chain together with a warm soapy solution is placed in the bottle and shaken vigorously. The chain loosens the hardened, clinging dirt or chemical film to permit removal through the detergent action of the soap.

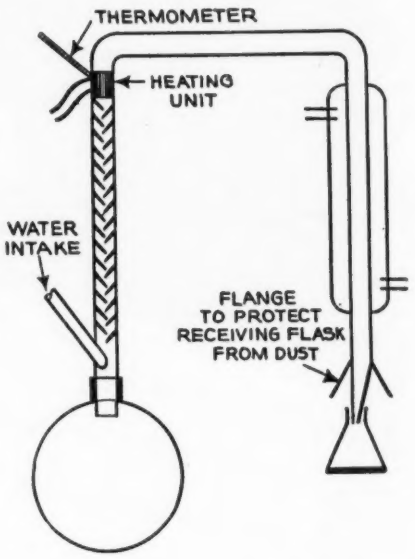
Protective Sleeves

Protective sleeves made of fabric coated with vinyl resin have been added to the line of industrial clothing of The B. F. Goodrich Company. The sleeves are of lightweight, pliable material, black outside and olive drab inside, with length of between 16 and 17 inches. The sleeves are particularly valuable for workers who need protection against oils, most acids and alkalies.

Super-Distilled Water

While conducting certain experiments requiring water free from heavy metal ions, Dr. Stanley Ames (now at the U. of Wis.) and colleagues, working at Columbia University, encountered trouble in obtaining sufficiently pure water. They were particularly interested in water free from iron and copper, and ordinary glass-distilled water contained appreciable amounts of these metals. It was decided that water in the condensation zone containing minute quantities of metal ions might be creeping over the receiving flask in the all-Pyrex glass distillation setup. When a "break" in the form ot a heating element at the top of the Vigreux distilling column was installed, this difficulty was eliminated.

The "hot zone" is heated by means of a nichrome wire coil embedded in asbestos and provided with a thermometer. Current may be furnished by a 110 v. circuit with a rheostat or series of light bulbs for adjustment. The temperature of the unit was kept at 140 degrees C. by the Columbia workers.

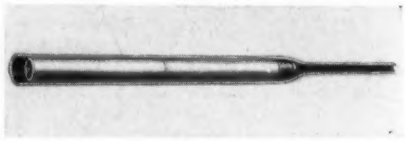


Combustion Tubes

The Harry W. Dietert Co. has announced an improved combustion tube assembly for carbon and sulfur determination in metals and other combustible materials.

Two lengths of cylindrical refractory tube liners are inserted within the combustion tube.

The combustion tube assembly is inserted within a high temperature laboratory combustion furnace. The boat containing the weighed sample is placed within the liner at the center of the combustion tube. This center liner will protect the combustion tube from the metal



and slag splatter. When the center liner becomes so full of splatter that it interferes with the boat passage, it is removed and a new liner is inserted.

The life of the combustion tube is materially increased when liners are used. This combustion tube assembly makes for time saving and more economy than the practice of using boat covers.

Number 8 of a Series: "Looking at the 5 essential things you never see in anodes!"

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by the Carload

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Manufacturing experience has helped us to make "Acheson" graphite anodes of lower usage cost, due to slower voltage rise and longer diaphragm life. It has helped also to furnish you with anodes of greater uniformity and slower consumption.

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INDUSTRY'S BOOKSHELF

Wax Data Compiled

COMMERCIAL WAXES, NATURAL AND SYNTHETIC, A SYMPOSIUM AND COMPILATION, edited by *H. Bennett.* Chemical Publishing Co., Inc., Brooklyn 2, N. Y., 1944; 583 pp., $11.00. Reviewed by L. C. Cartwright, Foster D. Snell, Inc.

THE NEED for a comprehensive volume on the types, sources, properties, and technology of waxes and wax compositions used in industry has been acutely apparent for some time. New and expanding applications of waxes in protective finishes, packaging, and other fields, as well as the increasing commercial availability of new types of waxes, both natural and synthetic, have accentuated this need. The information available has been limited and widely scattered throughout technical and trade journals, handbooks, and descriptive literature supplied by manufacturers and dealers.

The present work represents an admirable effort to fill this need. As the sub-title states, it is a symposium and compilation of information and data from many sources. The editor is the technical director of Glyco Products Co., Inc., and editor of *The Chemical Formulary.* In addition to substantially all of the pertinent data from various handbooks, a reasonably complete survey of the literature, and considerable previously unpublished data from his own laboratory, the editor has included original data and contributions from more than twenty individuals, as well as material supplied by various manufacturers of waxes and wax compositions.

In the introduction the editor discusses the classification of waxes on the basis of their chemical composition rather than their physical properties, but wisely chooses the latter as the criteria for a book on commercial waxes. The first chapter, on natural waxes, is devoted to paraffin, other mineral waxes, vegetable waxes, and animal and insect waxes. Sources, properties, and uses are discussed, and data presented in the form of graphs and tables. The second chapter gives similar information on manufactured and synthetic waxes, while the third chapter deals with physical properties of waxes and wax compositions, including data on viscosity, surface tension, melting point, solubility, hardness, electrical constants, and information on the modification of these properties by additions and combinations. The fourth chapter, on wax technology, deals with determinations of physical and chemical properties, identification of waxes, and general information on preparation of solutions and dispersions of waxes. The following chapter, Waxes in Industry, covers some thirty fields of application, ranging from embalming preparations to carbon paper, each section being written by a specialist in that field. Chapter VI, eighteen pages of tables and glossary, contains tables of origin, uses, solubility, and definitions of many technical terms. The final chapter, Wax Formulary, gives more than a thousand formulas for various products containing wax, with brief directions for preparation. There is a brief appendix on substitutes and an adequate subject index, but no author index and no bibliography. Literature references are given by footnotes, and authors' names are given under the titles of special sections.

This book will prove very useful to chemists, engineers, and others interested in the application of waxes and wax compositions in many fields of industry because it contains so much information not available from any other single source. However, it would be of much more assistance if the sources of data were more fully given, with the reliability denoted or critically evaluated. Other highly desirable features that might have been included are (1) an indication of the present and potential commercial availability of some of the lesser known natural waxes, (2) manufacturers or sources of many of the synthetic waxes mentioned only by trade names, and (3) brief statements as to the identity and authority of the various contributors. The arrangement and correlation of data might have been improved considerably, and greater consistency in units, such as use of either °F. or °C., for melting points, rather than whichever the original data was given in, would have simplified comparison of properties.

Monograph on Formaldehyde

FORMALDEHYDE, by *J. Frederic Walker.* Reinhold Publishing Corporation, N. Y., 1944; 393 pp., $5.50.

"THE GROWING importance of formaldehyde as a commercial chemical, its many unique characteristics, and its varied applications have created a definite need for a systematic and critical account of formaldehyde chemistry."

These words, from the preface, outline the purpose and scope of this most recent American Chemical Society monograph.

Formaldehyde wears a coat of many colors, in that it occurs in many forms: the monomeric gas, trioxane, tetraoxymethylene, polyoxymethylene, methylene glycol, and various polymer hydrates. The first few chapters are devoted to a discussion of these diverse forms. One chapter is devoted entirely to the properties of the polymers.

Considerable attention is paid to the physical properties of the substance and its solutions: heat capacity, heat of formation, absorption spectra, reaction kinetics, surface tension, viscosity, and the like. A short but important chapter gives pertinent data on commercial formaldehyde solutions, proper methods of storage, and hazards associated with its handling.

The major portion of the book is devoted to reactions of formaldehyde with different reagents. Among reactions discussed are those with inorganic agents, such as metals and metal hydroxides, ammonia and its derivatives, halogens, sulfur dioxide, hydrogen sulfide and cyanide, carbon monoxide, acids, and peroxides; with aliphatic hydroxy compounds and mercaptans; aldehydes and ketones; phenols; carboxylic acids, anhydrides, acyl chlorides, and esters; amino and amide compounds; and with hydrocarbons and their derivatives.

Two chapters are given to the detection and quantitative analysis of formaldehyde, while another chapter is devoted to a consideration of hexamethylenetetramine.

The final chapters list the industrial uses of formaldehyde, its polymers, and hexamethylenetetramine.

Each chapter is liberally annotated with references to the original literature, making this monograph a valuable key to every phase of formaldehyde chemistry.

Other Publications

SEAMLESS STEEL TUBE DATA has been compiled in recent catalog with pages measuring 8 by 11. Organized in six sections, the book gives first general information (history and lists of standard steels). In sections 2 and 3 are data relating to tubes for specific applications such as mechanical, including aircraft tubing, and equipment for pressure services. Section 4 contains reference tables, while the glossary, section 5, defines terms. The index comprises the final pages. The catalog may be obtained from Seamless Steel Tube Institute, Gulf Building, Pittsburgh, Pa., Price $2.50.

A. S. M. E. MECHANICAL CATALOG AND DIRECTORY 1944. This new volume contains more catalog descriptions than the 1943 edition. The classification of products produced in this country has been expanded and revised to include latest information. Published by The American Society of Mechanical Engineers, 29 West 39th St., New York.

CORN. Vol. 1, No. 1 appeared in February with the conviction that "the story of growing, marketing, processing and consuming corn — the greatest crop America has—is a story but little known to many yet deserving the attention of all." Far from "corny," as might be inferred from the title, this four-page bulletin is timely and informative. Published by Corn Industries Research Foundation, 5 East 45th St., New York.

1945 PLASTICS CATALOG. This edition contains several new features which include: statistical information for the industry, the first overall price list of plastics, articles on recently developed materials (silicones, polectron), and articles on engineering design, plastic models, extruding machines and molding plant equipment. Plastics Catalog, 122 East 42 Street, New York. Price $6.00.

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U.S.I. CHEMICAL NEWS

April ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1945

Current Shortages Rouse New Interest In Natural Resins

Spectacular Pacific Successes Seen Hastening Large-Scale Availability

Synthetic resins, like other commodities required in the war effort, have been subjected to varied restrictions as a result of constantly changing Government specifications and raw-material shortages. The first serious shortage was in glycerine, which affected the availability of many synthetics. Then, when glycerine again became available, the demand for phthalic-alkyd type resins and paints by the armed forces increased to such an extent that WPB had to place these resins under allocation.

Next came allocation of phenolic resins and, later, of the raw materials required for maleic and other specialty resins. Each move reflected the changed requirements of the military and each, of course, affected the availability of the different resins for essential civilian uses. The only conventional synthetic resin that remained free of Government restrictions as to raw materials was Ester Gum; but here the quantities available were consumed in high-rated uses so that, in effect, even it could not be considered for civilian use.

New Resins Made

Protective coatings manufacturers were forced to shift from one type of resin to another, just as the resin manufacturers were forced to shift raw materials. U.S.I., for example, found itself turning "technological handsprings" in its research laboratories and plants to make available, first, the urgently needed war resins, and then to provide new and previously untried types for varied purposes. These purposes ranged all the way from resins for use as shellac substitutes and as replacements for phthalic and alkyd types, to resins that could be used in place of the natural resins usually imported from Far Eastern areas occupied by the enemy.

Rosin Allocated

During the past month, WPB has placed rosin under allocation, setting individual consumption and inventory quotas for specified industries. This has forced the use of resins that contain either very little rosin or none at all. Through the importation of currently available natural resins, U.S.I. has kept stocks available of Congo Gum, Kauri Gum, and Accroides (Yacca or Red Gum), none of which contain rosin. Of these types, the most widely used is Congo Gum, which, until two months ago, was available for use without restriction. However, in March, due to the shortage of rosin and the resulting heavy demand for all types of rosin-free resins, the WPB placed all natural resins under Allocation Order M300—Schedule 96.

Importation of the largest possible quantities of Congo Gum, Kauri Gum and Accroides are being continued. It must be remembered, however, that war-time conditions present difficulties in gathering the gum and shipping it. It is to be expected that the spectacular advances of our armed forces in the Pacific area will open the important gum pro-

(*Continued on next page*)

Sees Hope for Early Return of Many Prewar Denaturants

Freeing of Axis-Held Territories Already Reflected in Increased Supply of Essential Oils Used in Drugs and Cosmetics

Kwang-Si Province, Calabria, Java, Madagascar, Spain, Siberia—such were the widely scattered areas of the world upon which the alcohol industry depended for denaturants used in alcohols for making lotions, shampoos, bay rum, mouth washes and the rest. Starting with the fall of France, many of these areas fell into enemy hands. Spain presented political difficulties. In Siberia and Australia, as in America itself, available manpower had to be concentrated on the production of allied war materials.

Harvesting citronella grass in Ceylon. Oil of citronella is the starting point for the synthesis of menthol.

Measures taken by alcohol producers, the Treasury Department and Central and South American countries have, to a surprising extent, alleviated many of these shortages. U.S.I., for example, has followed a system of interplant transfers which, while costly, has helped to meet customers' needs equitably.

Italian Shipments Start

However, the shipment of 80,000 pounds of oil of bergamot from Italy, last year, was the signal for new hope for the early return of the many essential oils which cannot be produced economically in the Western Hemisphere. The freeing of France and the rapid rolling back of the Japs in the Pacific has given fresh impetus to these hopes. Here, briefly, is the current situation as it affects the more important odoriferous denaturants:

Oil of citronella — Important as the starting point for the synthesis of menthol, this oil came principally from Java. Currently, an inferior grade is available from Ceylon. Guatemala and other Central American Countries have started growing citronella grasses, but it will take a year or two to get real production.

Mint oil — This source of natural menthol is now coming in large quantities from Brazil. While higher in price than the product originally obtained from Japan, natural menthol is now cheaper than the product synthesized from oil of citronella.

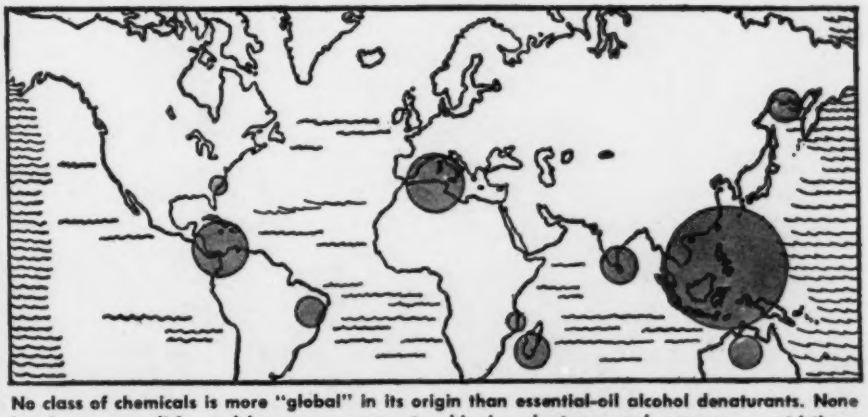
Oil of cassia — This essential oil (USP), which is used as a substitute for oil of cinammon, was produced exclusively in Kwang-Si Province, China. Currently synthetic oil of

(*Continued on next page*)

Claisen Reactions Yield Superior Drying Agents

Drying properties greatly superior to those found in naturally occuring oils, such as linseed, tung and certain fish oils, are claimed for a series of new esters described in a recent patent.

These esters are generally prepared by condensing, via a Claisen reaction, esters derived from the glycerides of natural oils such as tung, menhaden and sardine. These esters are heated in the presence of a condensing agent such as sodium hydride or U.S.I.'s Sodium Ethoxide until the conversion to the sodium derivative of the beta-keto-ester is substantially complete. The reaction mixture is then acidified and washed free of salt, acid and other soluble impurities. The water and diluent are removed by distillation and the desired product recovered as a residue.



No class of chemicals is more "global" in its origin than essential-oil alcohol denaturants. None has been more dislocated by enemy conquests, shipping shortages and manpower restrictions.

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April ★ **U.S.I. CHEMICAL NEWS** ★ 1945

Natural Resins

(Continued from preceding page)

ducing centers in the Philippines, Netherlands, East Indies and Singapore — much sooner than we once thought. The availability of these important resins will alleviate continuing shortages of rosins and synthetic resins without placing an additional strain on our domestic manpower.

Removes Fatty Acids by New Technique

Vegetable and animal oils for many uses are said to be freed from color, lipoids and free fatty acids by a technique which uses a vacuum neutralizer, but no heat.

The oil to be treated is first washed with water. After agitation, the mixture of oil and water is allowed to stratify, the lipoids being drawn off as part of the water layer. The oil is made color-free by mixing with clay and filtering.

Rid of lipoids and color, the oil is treated with a mixture of ethanol and sufficient sodium hydroxide to saponify the free fatty acid, the final reaction in this step taking place as the mixture is sprayed, under vacuum, into a neutralizing chamber. The result of this reaction is alcohol soap and colorless oil, free from lipoids and fatty acids. Alcohol is recovered from the residue by distillation, leaving a by-product of relatively high-grade soap stock.

New Dry Mounting Tissue Uses Phthalates and Alcohol

A new type of dry mounting tissue, used to produce fast, flat mounts of photographs and the like, is described as overcoming the common tendency to "block" or stick together in the package. The new tissue, described in a recent patent, is coated with a thermoplastic adhesive which does not become tacky at temperatures below 125 F., and therefore is non-adhesive at normal room temperatures. The adhesive heat seals, however, when pressed with an iron maintained at 200 to 220 F.

The adhesive consists essentially of cellulose acetate butyrate, a compatible plasticizer, such as diethyl or dibutyl phthalate, and an alkyd resin. The adhesive may be applied to the tissue from a melted mixture or in a benzene-denatured alcohol solvent.

Prewar Denaturants

(Continued from preceding page)

cassia, denaturant grade, is substituting for this substitute.

Camphor — Synthetic camphor has been in large-scale production in this country ever since the Japanese monopoly was broken in the early 30's. However, its important uses in photographic film, plastics, etc., made it hard to get now.

Oil of lavender — When the price of this product of Southern France skyrocketed, the Treasury Department authorized the substitution of domestic oil of cedar leaf. It is hoped that lavender will soon again be available from France.

Oil of bay — This essential ingredient of the familiar bay rum is a product of Puerto Rico and the Virgin Islands. It is now being imported without serious difficulty.

Domestic products — Oils of sassafrass, turpentine, pine, wintergreen, peppermint and cedar leaf were, fortunately, in production in this country long before the war. However, the shortage of manpower and the needs of our armed forces have combined to seriously limit the use of these oils as denaturants.

Separating clove buds and stems on far-off Zanzibar. Oil of cloves also comes from the French Island of Madagascar.

Prolonged Penicillin Action

Following research in the Naval Medical Corps, it is indicated that the effective action of a mixture of penicillin and beeswax-peanut oil lasts much longer than penicillin alone. Action is still further prolonged by application of an ice-bag at the point of injection.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

To seal waterproof bags, four adhesives are offered. Different characteristics claimed for each adapt them to four different types of jobs. They are said to meet Army-Navy packaging specifications. **(No. 921)**

USI

A range of filter aids is offered for tasks such as clarifying beer, refinery products and pectins. They range in size from one designed to remove colloidal matter of less than 0.1 micron diameter, up to those of several times that pore size and flow rate. The aids are milled from finest diatomaceous silica. **(No. 922)**

USI

Soap that lathers better, and requires less soap substance, is promised by the processor of a new colloidal clay, offered for use in soap manufacture. **(No. 923)**

USI

A new rolling-oil additive, for the metal working industry, is designed to blend with mineral oil at room temperature, and to be modified by adding kerosene. This refined fatty ester additive can be combined in proportions of 3 to 5 per cent of the mineral oil. **(No. 924)**

USI

Rigid synthetic rubber products of high electrical resistance can be produced by incorporating a new resin substitute for carbon black, according to an announcement. Proper mixtures of the three grades of the new resin are said to impart desired qualities of rigidity, hardness, elongation and tensile strength. **(No. 925)**

USI

A new wetting agent, claimed to contain no oil and only a trace of inorganic salts, is said to be particularly adapted to tasks such as scouring wool, wetting back dried skins, and in fulling soaps to assist rinsing, etc. **(No. 926)**

USI

A new adhesive, which should provide time and labor savings in merchandise handling, is designed to hold paperboard and wooden boxes together in unit loads. It is said to combine high shear strength with low tensile strength, thus preventing slippage during transit, yet making it easy to separate packages at their destination. **(No. 927)**

USI

A fire- and shock-resistant plastic, that is said to generate no toxic gases when heated, and to be easily molded, has been developed. Key to the unusual properties of the new plastic is the use of asbestos instead of organic compounds as a filler. **(No. 928)**

USI

A new glass is being manufactured to withstand operating temperatures up to 650 F and thermal shock to 400 F. It is said to have four times the strength and six times the shock-resistance of plate glass, and is suggested for use in tanks for acids, alkalis and solvents. **(No. 929)**

USI

To recover valuable metals from waste solutions is the stated function of a new process using anion exchange resins. **(No. 930)**

U.S.I INDUSTRIAL CHEMICALS, INC.

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Amyl Acetate
Butyl Acetate
Ethyl Acetate

OXALIC ESTERS
Dibutyl Oxalate
Diethyl Oxalate

PHTHALIC ESTERS
Diamyl Phthalate
Dibutyl Phthalate
Diethyl Phthalate

OTHER ESTERS
*Diatol
Diethyl Carbonate
Ethyl Chloroformate
Ethyl Formate

INTERMEDIATES
Acetoacetanilide
Acetoacet-ortho-anisidide
Acetoacet-ortho-chloranilide
Acetoacet-ortho-toluidide
Acetoacet-para-chloranilide
Ethyl Acetoacetate
Ethyl Benzoylacetate
Ethyl Sodium Oxalacetate

ETHERS
Ethyl Ether
Ethyl Ether Absolute+A.C.S.

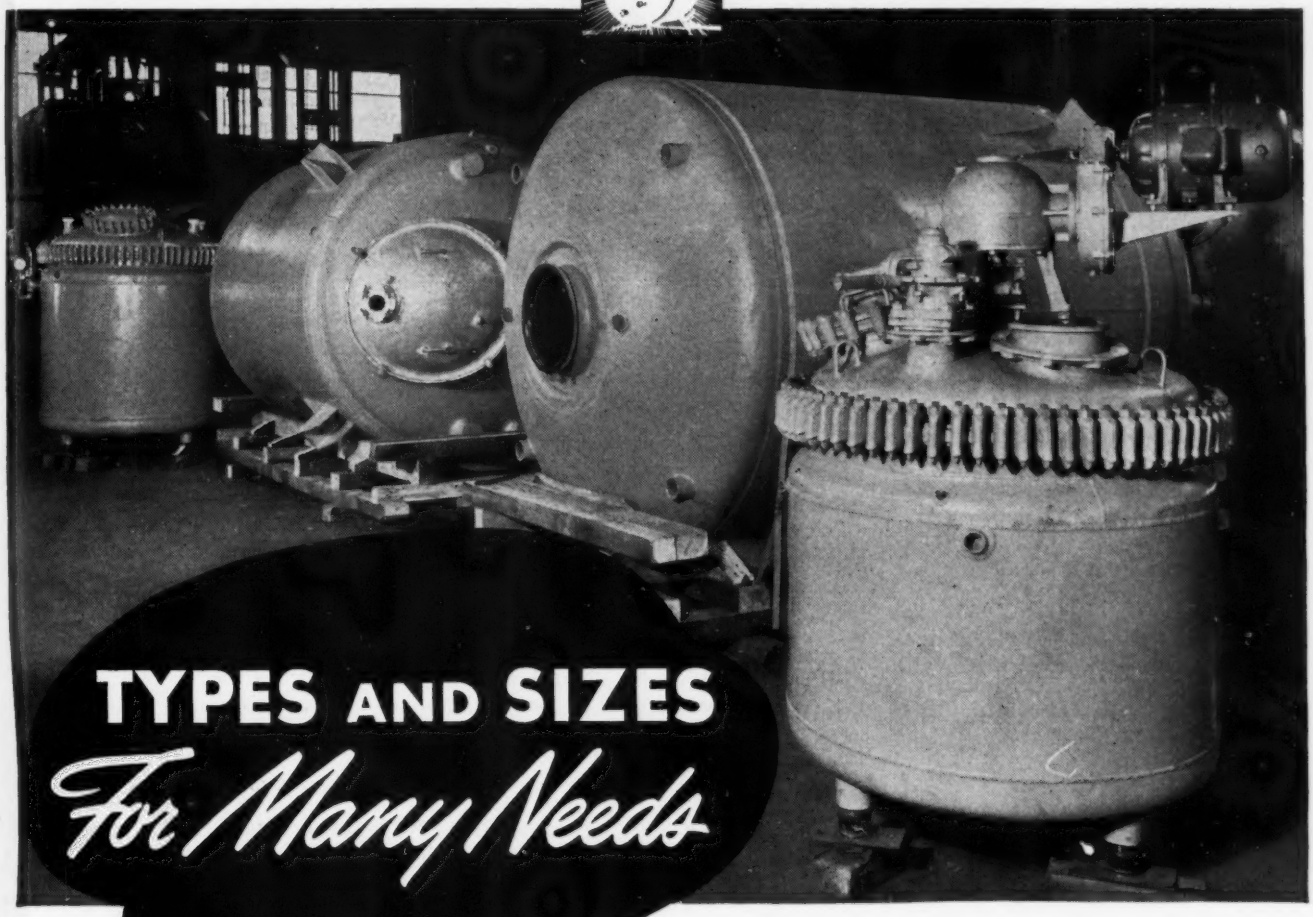
FEED CONCENTRATES
*Curbay B-G
*Curbay Special Liquid
*Vacatone 40

ACETONE
Chemically Pure

RESINS
S&W Ester Gums—all types
S&W Congo Gums—raw, fused & esterified
S&W *Aroplaz—alkyds and allied materials
S&W *Arofene—pure phenolics
S&W *Arochem—modified types
S&W Natural Resins—all standard grades

OTHER PRODUCTS
Collodions — Ethylene
Ethylene Glycol — *Indalone
Nitrocellulose Solutions — Urethan

THE INERTNESS OF GLASS THE STRENGTH OF STEEL



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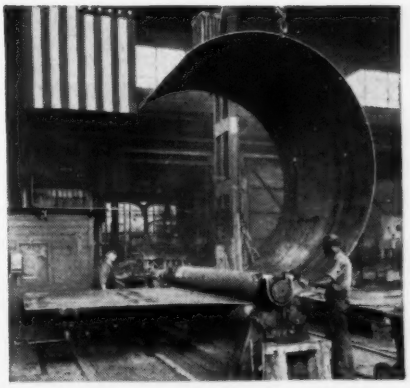

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BOOKLETS & CATALOGS

Chemicals

A763. CELLULOSE PRODUCTS. A pocket-size booklet containing the list of chemicals made and sold by the Cellulose Products Department of the Hercules Powder Co., types available, and pertinent packing and shipping information is now available from that department.

A764. CELLULOSE THERMOPLASTICS. A 20-page booklet, which lists and describes the results of dimensional stability tests on cellulosic plastics at high temperatures and high humidities has been prepared by the Cellulose Products Department of the Hercules Powder Co. Four tables of data and an explanation of test conditions are contained in the booklet.

A765. CHEMICALS in the cellulose family, rosins and modifications, rosin esters and synthetic esters, terpene solvents and chemicals, explosives and special products are described in a new booklet listing the products of the Hercules Powder Co. The products are first indexed according to the industries served and then according to chemical family with an indication of postwar applications.

A766. DETERGENT. A new synthetic detergent of the substituted sodium alkyl sulfonate type is described in a 4-page report issued by the Solvay Process Co.

A767. EMULSIONS. The latest catalog of the Emulsol Corp. includes a description of their products, excerpts from the Federal Food, Drug, and Cosmetic Act, the Federal Insecticide Act, in addition to a discussion entitled "Emulsifiers, Emulsions, Emulsification," a list of the patents covering the inventions originated and developed by the Emulsol Corp. is included.

A768. GLUES. Wood-bonding with urea resin glues is discussed in a recent publication of the Bakelite Corp.

A769. INDUSTRIAL FINISHES. A group of speed-baking organic industrial finishes produced by the Ault and Wiborg Corp. is described in a booklet which notes the types available.

A770. LUMINESCENT PIGMENTS are discussed in a booklet containing an illustrated study of the possible postwar uses. Rhode Island Laboratories, Inc.

A771. PLASTIC. Compar, a specially compounded solvent-proof vinyl resin is carefully described in a new 16-page illustrated catalog, with properties, specifications, and applications to industry. Resistoflex Corporation.

A772. PLASTIC COATING. A 4-page folder of the American Pipe and Construction Co. describes their #44 acid-resistant plastic coating.

A773. PLASTICIZERS. Essential information on important commercially available plasticizers is contained in a 15-page booklet of the Carbide and Carbon Chemicals Corp. Names, formulas, physical properties and specifications, charts showing compatibilities with commercial resins, and performance data are included.

A774. RESIN GLUE. An 8-page booklet containing the instructions for handling the Bakelite cold-setting phenolic resin glue, XC-17613, has been issued by the Bakelite Corp.

A775. RESINS. Complete information to enable evaluation of Pentalyn resins, particular attention being directed to the paint and varnish industry, is contained in a recent booklet of the Hercules Powder Co.

A776. RESINS AND PLASTICIZERS. The Neville Co. has issued an 82-page book on the resins, plasticizing oils, solvents, and chemicals which they produce. They are described in much detail and practical uses are suggested. Detailed specifications, properties and compatibilities are given and many figures and tables have been utilized to define the characteristics of these products.

A777. WAX. Properties and suggested uses for a new high-melting wax, Acrawax C, are noted in a new 16-page booklet of the Glyco Products Co.

A778. WAX, ASPHALT, and other similar compounds are discussed in a 63-page booklet of the Mitchell-Rand Manufacturing Co., particular attention being directed towards the properties and suggested uses for these materials.

A779. WHY CELLULOSE PLASTICS? titles a 4-page booklet printed in color, which illustrates the properties of the cellulose plastics family. Hercules Powder Company.

A780. YEAST ADENYLIC ACID. A new bulletin describes the characteristics and properties of this important purine compound, and also includes a table of literature references. Schwarz Laboratories, Inc.

Equipment—Methods

F296. ACID-PROOF BRICK. A permanent, acid-proof floor, designed as a universal working surface, is described in a 16-page illustrated brochure of the Belden Brick Co.

F297. AIR DIFFUSERS. Data on selection, application, location, assembly, erection, adjustment and testing of air diffusers has been compiled in handbook form by the W. B. Connor Engineering Co.

F277. AIR POWER. Reciprocating and rotary tools and the use of compressed air are several of the subjects covered in a recent 20-page, generously illustrated booklet from Ingersoll-Rand.

F299. CARBON AND GRAPHITE PRODUCTS, manufactured by the National Carbon Co., are described in a new 20-page bulletin. The products are presented in sequence as applied in the various industries and there are many charts covering physical and chemical properties.

F300. CATHODE RAY TUBES. Four new and seven replacement specification sheets on cathode ray tubes, to be added to the Allen B. Dumont Laboratories reference manual, are now available.

F301. CHAIN BELT. The Rex Table Top Chain Belt is described and illustrated in a recent catalog of the Chain Belt Co. Engineering data, diagrams, charts and prices are included.

F302. CLASSIFIER. The new 16-page bulletin of the Denver Equipment Co. discusses the basic principle of surface current classification and its application in mechanical classifiers. Complete specifications and dimension drawings.

F303. COLOR for industry is the subject of a 16-page booklet of the U. S. Gutta Percha Paint Co.

F304. COLORS. A discussion of the use of color in industry along with a compilation of the standard A.S.M.E. code for identification of piping systems is included in a catalog of the Arco Co. A practical guide to color usage has also been issued by the same company.

F305. COMPRESSORS. A recent booklet from the Ingersoll-Rand Co. describes the KVG compressors and the companion PKVG gas engine. The booklet lists the basic features of this 4-cycle V-type compressor along with cross sections of end and longitudinal views.

F306. CONDENSER TUBE INLET. A bulletin released by Condenser Service and Engineering Company describes the short belled-end metal inserts which are used to protect condenser tube inlets against erosion. Results of tests on these inserts are given in some detail.

F307. CONDENSERS. Both the disc-flow and the ejector-jet types of barometric condensers are discussed in a new bulletin of the Ingersoll-Rand Co. Its contents include a number of photographs

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and schematic drawings as well as descriptive matter.

F308. Corrosion Resistant Linings are the subject of a new folder issued by the Stebbins Engineering and Manufacturing Co., describing their ceramic materials.

F309. Dust Collectors. The Whiting Corp. has recently announced the publication of five new bulletins dealing with the suppression of dust and fumes.

F310. Electric Motors. A 4-page bulletin published by the Crocker-Wheeler Division of the Joshua Hendy Iron Works describes a new protected type motor designed for both drip-proof and open motor applications.

F311. Electronic Products. The North American Philips Co. has just issued a condensed catalog giving a brief description of a few of their many electronic products.

F312. Filter Presses. A description of the various types of plates and frames available and illustrations of the methods of their usage are noted in a 19-page booklet which was recently issued by T. Shriver and Co. Charts illustrating the approximate costs of the various types of filter presses are also included.

F313. Flange for Flexible Metal Hose. An instruction folder showing photographically the assembly of a new detachable flange for helical flexible metal hose is available from the Packless Metal Products Co.

F314. Fluid Handling Equipment. The J. A. Zurn Manufacturing Co. has announced a new catalog describing their line of strainers and other interceptors for the protection of operating equipment.

F315. Fused Silica Products are described in a new bulletin that has been issued by the Amersil Co. The outstanding characteristics of fused silica and fused quartz products are given in addition to illustrations of a few of their products.

F316. Glass Tanks. The new all-glass tanks developed by the Pittsburgh Plate Glass Co. are described and pictured in a 4-page folder.

F317. Heat Exchangers. A new 12-page loose-leaf booklet on Adsco heaters and coolers includes three new types. Dimensions, capacity tables, and list prices are also noted. American District Steam Co.

F318. Industrial Electronics are described in considerable detail in a 30-page booklet issued by the General Electric Co.

F319. Instruments. The various thermometers, recorders, and controllers produced by the Gotham Instrument Co. are described in a recent booklet.

F320. Kneading Machines. Northmaster Kneading Machines are described in a 16-page bulletin which gives complete details, including tables of standard sizes and capacities, mixing chamber and blade types, as well as complete construction data and available optional features. Struther-Wells Corp.

F321. Laboratory Apparatus. A 64-page catalog supplement has just been issued by the Scientific Glass Apparatus Co.

F322. Laboratory Heaters. A 4-page folder of the Precision Scientific Co. illustrates their new line of safety heaters.

F323. Liquid Level Control Valves are described in a booklet available from the Clayton Manufacturing Co. Pictures, sizes available, and means of operation are included.

F324. Magnesium Alloys is the subject of a catalog of the Dow Chemical Co. which, via word and picture, answers twenty-four questions about this relatively new structural metal.

F325. Petroleum Refining. This report, abundantly illustrated with photographs and diagrammatic material, analyzes the various modern petroleum refining processes, and includes a definition of the major refining processes. M. W. Kellogg Co.

F326. Pumps. A 104-page catalog describing the range of sizes in industrial and sanitary pumps is available from the Bump Pump Co. It contains operating and construction features, dimensions and installation diagrams, horsepower charts, and equivalent and friction loss tables.

F327. Pumps. A fairly detailed explanation of the operation of self-priming centrifugal pumps and a discussion of their installation and operation is included. Suggested applications are also noted. Marlowe Pump Co.

F328. Rubber Gloves. A 4-page folder is available describing the all-synthetic industrial rubber gloves and plastic treated aprons produced by the B. F. Goodrich Co.

F329. Safety Clothing for protection against flying sparks is described in a recent booklet issued by the American Optical Co.

F330. Steam Boilers. A 6-page folder describing the International-Lamont LFS Steam generator can be obtained from the International Boiler Works Co. In addition to a description of these boilers it illustrates how increased capacities can be obtained from existing installations.

F331. Steam Jet Ejectors. Operating characteristics, principles, and features of the steam jet ejectors produced by the Ingersoll-Rand Co. are given in a new bulletin. Photographs, construction details, and schematic diagrams of various setups are included.

F332. Stoker. The J. and J. spreader type stoker is the subject of a recent bulletin of the Johnston and Jennings Co. It is a combination mechanical-pneumatic coal distributing system.

F333. Stoneware Equipment. Pictures and specifications for the stoneware storage and mixing equipment for acids and other corrosive materials are given in an 8-page booklet of the U. S. Stoneware Co.

F334. Varnish Selector. The insulating varnish selector devised by the Resin and Insulation Materials Division of the General Electric Co. will simplify the choice of the correct varnish for treating coils and general motor repair.

F335. X-Ray Spectrometer. An apparatus providing a new method of making quantitative and qualitative analyses of crystalline and certain amorphous substances, valuable to process control in the paint, chemical, ceramic, rubber and metallurgical fields, is described in bulletin A-30104. North American Philips Company.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

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A765	A773	F296	F304	F312	F320	F329
A766	A774	F297	F305	F313	F321	F330
A767	A775	F298	F306	F314	F322	F331
A768	A776	F299	F307	F315	F323	F332
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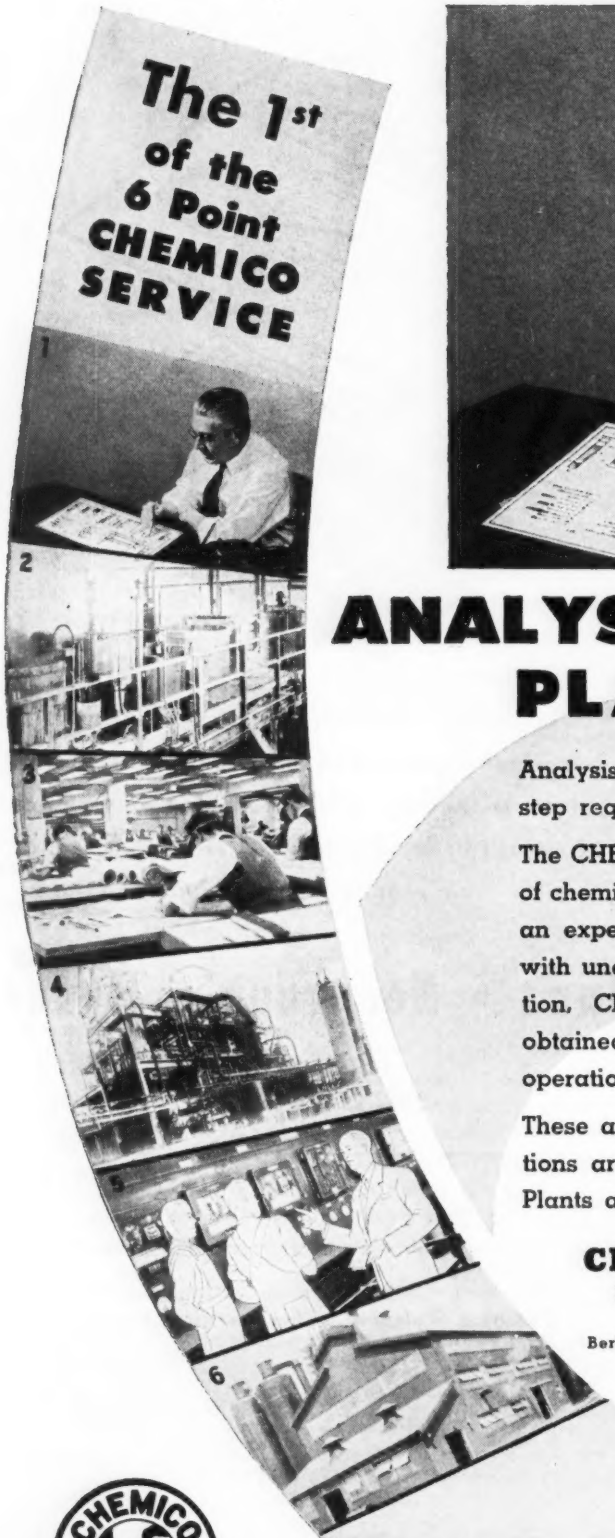

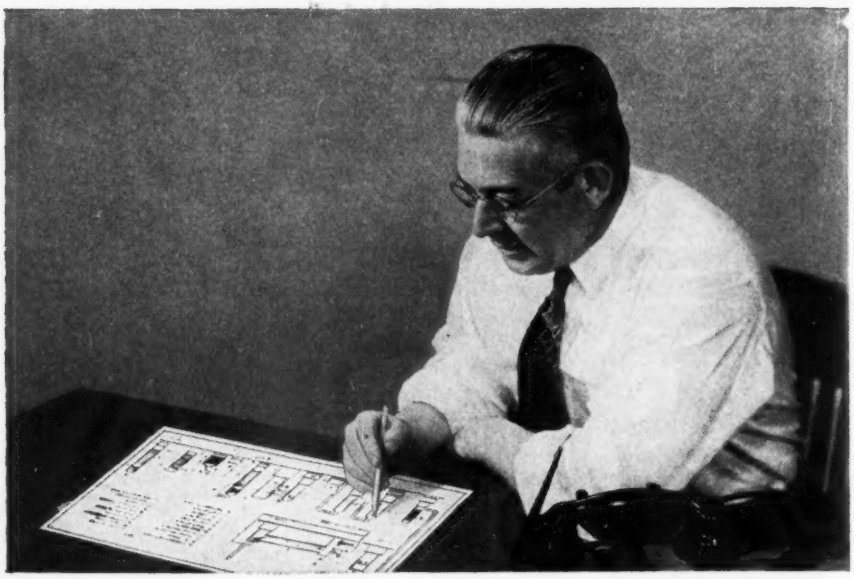

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NEWS OF THE MONTH

Bureau of Mines Starts Oil-Shale Development

The Bureau of Mines has selected a site on United States Naval Oil Reserves in western Colorado for a $1,500,000 oil-shale demonstration plant, one of the major installations authorized by Congress in the synthetic liquid fuels act.

To be established in the Anvil Points area, about 7 miles west of the town of Rifle, this plant will serve as a proving ground for processes being developed to convert the Nation's large reserves of oil shale into an auxiliary source of fuels and lubricants for the military forces and the essential civilian economy, Secretary Ickes said. It will be built on Government-owned land and will be operated in conjunction with an oil shale research and development laboratory which is to be built at Laramie, Wyoming, on a site donated to the Federal Government by the University of Wyoming.

Funds for the construction of both the demonstration plant and the laboratory have been appropriated by Congress under authority of the so-called O'Mahoney-Randolph Act (Synthetic Liquid Fuels Act, Public Law 290).

Selection of the Rifle and Laramie sites puts essential parts of the five-year synthetic liquid fuels program in operation. This program embraces liquid fuels from both coal and shale sources. Bureau of Mines technicians now are overseas examining recently captured German plants which made synthetic fuel from coal. At the same time, at Bruceton, Pa., the coal synthetic fuels laboratory is under construction. This is on the Bureau of Mines experimental coal mine land so all three sites so far selected have been without depletion of the synthetic fuels money for the purchase of private lands. There remains the selection of a site for a demonstration plant to make liquid fuels from coal. An extensive survey of such possible sites is going forward and final decision on this site which must handle coal from many fields will not be made for some time.

"Major parts of the Rifle plant will include a 200-ton-a-day shale mine which can be enlarged if necessary, a 1½-mile-long aerial tramway to carry the shale from the mine to the plant, and crushing and retorting equipment of a capacity adequate to provide useful information on methods of operation and costs for private industry. A shale oil refinery of pilot-plant scale will be added later when the technical information needed for its design and construction is obtained by the research and development laboratory.

To produce oil from oil shale, the shale is mined by methods similar to those used in coal mining, crushed, and charged into an oven where heat is applied. This breaks down the organic material and liberates the oil. A ton of high quality shale will yield 45 or more gallons of oil. Products closely resembling those commonly produced from petroleum, such as gasoline, Diesel fuel and waxes, can be made by distilling and refining shale oil.

WPB to Report Manufacturing Capacity

The War Production Board Production Readjustment Committee has announced that in cooperation with the military services and other procurement agencies it will issue reports on available manufacturing capacity in the United States twice each month.

These reports will be compiled for the purpose of assuring that maximum use for war production is made of all available plants in the country. The military services have agreed to check the list of open capacity plants prior to the placement of any direct war contracts, in order that production schedules may be speeded up. At the same time, WPB is urging all persons seeking to place subcontracts under military contracts to get in touch with their nearest local WPB office for information as to facilities they might use. Information gathered in the semi-monthly reports will be furnished to all local WPB offices.

The first of the new reports was issued February 15, 1945, and has been sent to all procurement officers and WPB field offices. It is expected that future reports will be wider in their coverage and, consequently, more valuable to both the armed services and subcontractors.

The national list includes plants with 100 or more workers or with 50,000 square feet or more of space that are being released for new production. Corresponding information on smaller facilities is available in the individual WPB field offices as well as through Smaller War Plants Corporation offices.

The list indicates the class of manufacturing plant, its name and location, class of labor area in which it is located, according to WMC classification, when it will be available, the amount of space available, number of employees and the product it is suited to make.

Merger Forms National Atantic Research

National Atlantic Research Corporation has been formed under Massachusetts laws. The new corporation combines the facilities and personnel of the laboratory of National Fireworks, Inc., and Atlantic Research Associate, Inc., Newtonville and Newton Center, Mass.

F. C. Atwood will head the company

Breth and Schindler Elected Vice-Presidents of Sonneborn

Dr. F. W. Breth (left) and Gustave Schindler (right) have been elected vice-presidents of L. Sonneborn Sons, Inc. Dr. Breth, who will be in charge of manufacturing, has previously been technical director. Mr. Schindler will continue as president of Petroleum Specialties, Inc., which he founded in 1939.

with Dr. Henry Hill, Dr. Joseph Ackerman and Edwin S. Dwelly serving as vice-presidents. Lloyd K. Larson will be treasurer.

Commercial Solvents Promotes Hines

George E. Hines has been made superintendent of the C. S. C. Penicillin Plant, prior to this he was engaged in research and development.

Collyer to Control Rubber

John L. Collyer, president of the B. F. Goodrich Co., has been appointed special director of all War Production Board activities relating to the production and distribution of rubber products according to an announcement by J. A. Krug, WPB chairman. Mr. Krug stated that the tire and rubber programs are "more critical than any time since Pearl Harbor." Mr. Collyer will replace James F. Clark.

Chemical Engineers Form New California Chapter

One of the first local chapters of the American Institute of Chemical Engineers west of the Mississippi River is now being organized in the San Francisco Bay area. Beginning in the fall of 1944, a number of regular meetings have already been held. About 25 companies are represented in the new organization, with 12 companies having 4 or more present.

Officers of the chapter are as follows: chairman, C. R. Nelson, Shell Development Co.; vice chairman, O. M. Chinnock, Hercules Powder Co.; secretary-treasurer, M. Souders, Jr., Shell Development Co.

Natural Reservoir To Store Helium

The greatest single helium storage reservoir in the world is being started by the Bureau of Mines in the 50,000-acre Government-owned Cliffside natural gas field in Texas where surplus helium will be piped back into the ground for conservation and future use, Secretary of the Interior Harold L. Ickes has announced.

Completion of a new 32-mile helium pipeline between the Exell and Amarillo, Texas, helium plants of the Bureau, together with pipeline connections to the Cliffside field near Amarillo, will permit the use of this natural underground storage place for the helium not needed now by military and Governmental agencies and not required for commercial distribution.

Although the helium piped back into the ground must be repurified later when it is withdrawn, the gas from the cache will be richer in helium content, the processing time will be reduced, and there will be immediate supplies of this valuable, lightweight gas on short notice.

Mining Institute Cites Mehl

The James Douglas Gold Medal has been awarded by the American Institute of Mining and Metallurgical Engineers to Dr. Robert F. Mehl, director of Metals Research laboratory and head of the department of metallurgical engineering, Carnegie Institute of Technology, "for distinguished achievement in physics and physical metallurgy."

E. Chester Wright, chief metallurgist and assistant to the president of National Tube Co., has been awarded the Robert Hunt Silver Medal and certificate for 1945 for the improvement in the process of making Bessemer steel.

Carl Gustave Hogberg, assistant to the chairman of the Blast Furnace Committee of the U. S. Steel Corp., has been awarded the J. E. Johnson, Jr., award.

Gifts to Columbia Support Research

Among the twenty cash gifts to Columbia University aggregating $50,428.84, announced by Dr. Nicholas Murray Butler, president, was $9,500 from the Corn Industries Research Foundation. Of this sum $5,000 will be used for the continuation of work on the physical properties of starch being conducted by Dr. Charles O. Beckmann, associate professor of chemistry, and $4,500 of which will be used by Dr. Mary Caldwell, associate professor of chemistry, for enzyme studies on starch.

Sharp & Dohme, Inc., gave $2,000 to establish the Sharp & Dohme Gift for study of drugs used for the treatment of endamoeba histolytica infections. Work will be carried out by the DeLamar Institute of Public Health.

Lederle Laboratories gave $1,400 to establish the Lederle Gift for the study of canine distemper. Mrs. Walter Graeme Ladd gave $1,000 to be credited to the Special Dean's Gift at the School of Medicine.

Gift to Armour Foundation

E. J. Brach and Sons have contributed funds for the purchase of equipment for the chemical engineering section, and technical books for the library of the Armour Research Foundation of Illinois Institute of Technology, according to Dr. Jesse E. Hobson, director. Gifts from the Brach company and National Acoustic Products total $10,500.

682 Wilputte Coke Ovens Built

Twelve batteries of underjet high and low burner by-product coke ovens, totaling 682 ovens, with an annual coal capacity of 5,951,900 tons, have been built by the Wilputte Coke Oven Corp. to meet the war demands of the metallurgical industry. One of two manufacturers of these ovens, Wilputte has constructed plants for du Pont at Morgantown, W. Va.; Semet-Solvay Co., Ironton, Ohio; Bethlehem Steel Co., Lackawanna, N. Y.; and Republic Steel Corp. at Warren Ohio, Gadsden, Ala., and South Chicago, Ill. In four plants, built since the start of the war, by-product equipment has been installed for the production of ammonium sulfate.

Diamond Alkali Acquires Clifford Neros

The Diamond Alkali Co., of Pittsburgh, has announced the appointment of Dr. Clifford A. Neros, formerly of the American Can Co., at Maywood, Ill., to its research and development department at Painesville, Ohio.

Dalley Directs Chemicals For Export Associates

J. Alden R. Dalley, former Chief of Health Supplies and Chemicals Division of the Foreign Economic Administration,

Washington, D. C., is in charge of chemical, drug, and allied lines for the Export Associates Development Company of 60 East 42nd Street, New York 17, New York.

Mr. Dalley organized the original chemical export license group under the Department of State prior to the United States' entry into the war, and headed this commodity division since its inception. Prior to his connection with the government, he was a consultant on chemical and pharmaceutical specialties, was Eastern and Foreign Manager for Sharples Chemicals, Inc., and foreign sales correspondent for Carbide & Carbon Chemicals Corporation.

Pratt Named for Powers Award

Wallace E. Pratt, petroleum geologist and a director of the Standard Oil Co. of N. J., has been chosen as the initial recipient of the Sidney Powers Memorial Award of the American Association of Petroleum Geologists.

PAW Approves Construction Of 5 Aviation Gas Plants

Five new plants for the production of 100 octane aviation gasoline are scheduled for construction and proposals for several more are under study, according to Petroleum Administrator Ickes.

The plants now scheduled are one for the Texas Co. at Lockport, Ill., two for the Standard Oil Co. of Indiana at Whiting, Ind., and Sugar Creek, Mo., one for Leonard Refineries, Inc., at Alma, Mich., and one for the Shell Oil Co. at Houston, Texas.

The new facilities approved by P.A.W. will be built entirely by private capital at a cost of $78 million.

Rubber Stocks

While the United States has carefully husbanded its stock of crude rubber, the need for even tighter conservation is great, as the following statistics covering imports, consumption, and the year-end stockpile of natural rubber indicate:

Year	*U. S. Imports (net)*	*U. S. Consumption*	*Year-End Stock*
1938	406,000	437,000	231,000
1939	486,000	592,000	125,000
1940	811,000	648,000	288,000
1941	1,023,000	775,000	533,000
1942	271,000	376,000	422,000
1943	34,000	317,000	139,000
1944	98,000	144,000	93,000

Meanwhile, synthetic production has mushroomed, as the following figures indicate:

Year	*Production (in tons)*	*Consumption (in tons)*
1942	24,000	.....
1943	234,000	.....
1944	763,000	567,000
1945	*1,000,000	†775,000
1946	*1,200,000	.....

* Production scheduled. † Estimated.

Chemical Industries Announces Staff Changes

Dr. Howard C. E. Johnson (left), assistant editor of Chemical Industries since August 1944, has been named chemical editor. Herman W. Zabel (right), formerly a chemical engineer in the development department of General Aniline & Film Corp., has joined the staff as engineering editor. Dr. Johnson came to Chemical Industries from the Rohm & Haas Co., where he was a research chemist after receiving his doctorate in organic chemistry from the University of Wisconsin. Mr. Zabel, a graduate of Kansas State College, taught chemical engineering at that institution and has held positions with Pratt & Whitney Aircraft Corp. and E. I. du Pont de Nemours & Co. Ammonia Dept.

Explosives Research Promotes Safety

Explosives research ranging from tests on new types of explosives for war and the nation's mines to experiments for eliminating hazards in the use of combustible anesthetics in hospitals were conducted last year in the laboratories of the Bureau of Mines, according to a report by Dr. R. R. Sayers, director. A method for making certain inflammable anesthetics explosion-proof was discovered.

Polaroid Conducts Research Seminars

The organic chemical research section of Polaroid Corp. is conducting a series of weekly seminars for the company's research personnel in chemistry, physics, crystallography, electronics, photography, and engineering. Consisting of lectures followed by discussion periods, the seminars correspond to meetings customarily held by science departments of graduate schools in universities.

The Polaroid seminars originated as an outgrowth of regularly scheduled research meetings required for a project undertaken by the research department about a year ago. Outlines and bibliographies of the talks presented at the seminars are kept for reference in the permanent files of the firm's library where the seminars are held under the direction of Dr. Elkan R. Blout, chief organic chemist at Polaroid.

Natural Gas Pipelines to Supply Appalachian Area

Two additional natural gas pipeline projects, designed to increase deliveries of gas from the Southwest to the Appalachian area, have been granted AA-1 priority ratings by the Office of War Utilities of the War Production Board.

One project involves the addition of four compressor stations on the Tennessee Gas & Transmission Co. pipeline from Monroe, La., to West Virginia. The other, involves construction of approximately 140 miles of 24-inch pipeline from the Carthage gas field in Texas to the Tennessee company at Monroe. Both are scheduled for completion by November 1.

Return of Ammonia Cylinders Urged

The flow of ammonia to essential war industries may be impeded if steel shipping cylinders are not returned promptly.

This warning has been issued by the ammonia department of E. I. du Pont de Nemours & Co. It was pointed out that the supply of ammonia for industry was adequate but shipping containers are barely meeting the demand.

A company spokesman said that the supply is sufficient to handle all requirements if returns are prompt. Manufacturers maintain stocks in important industrial centers for emergency use, and each industrial user was urged to order only amounts immediately required so cylinders would not be tied up in storage.

Printing Ink Supplies Scarce

Increasing military demands for phthalic anhydride have made the chemical unavailable for all but the most essential civilian uses, the Printing Ink Industry Advisory Commitee was informed at a recent meeting.

Among the colors affected are Phloxine toners and Rhodamines, used principally in four-color process printing, and it was suggested to the committee that steps be taken immediately to have engravers use lithol reds for proofing in the manufacture of color process printing plates.

Organic pigments based on benzol and toluol continue to be in tight supply, WPB said.

It may be necessary for consumers voluntarily to reduce inventories and for producers temporarily to suspend quota deliveries of chrome pigments so that uses designated in M-370 (Chrome Pigments) as exempt from the provisions of the order may be satisfied, the committee was told. No increase in civilian quotas of chrome pigments is in sight at present, WPB stated.

Consumption of rosin has far exceeded production during the last two years and, as inventories are at the lowest level in history, it is necessary that some control over consumption and inventory be instituted immediately, WPB said.

All synthetic resins continue in tight supply with moderate amounts of certain modified phenolics and maleics still available for essential printing ink uses.

WPB pointed out that the synthetic rubber program will continue to consume most of the carbon black produced, but it is hoped that the small amount necessary for printing ink use will be made available to the industry.

The present inventory restrictions on linseed oil, together with further reductions in consumption, will no doubt stretch out the dwindling supply of oil until the new crop of flaxseed begins to come in, WPB said.

Natural and Synthetic Resins Restricted

The over-all lead situation has been getting increasingly tighter, and available stockpiles of natural resins are rapidly diminishing, War Production Board officials informed the Paint, Varnish & Lacquer Industry Advisory Committee at a recent meeting held in Washington.

Greater restrictions on the use of lead in somewhat the same fashion as oil is restricted under M-332 (Oils for Protective Coating), may be necessary in the near future, WPB told the committee members.

The committee also was told of the continuing tight supply picture on phenolic resins and urea melamine resins, as a result of a formaldehyde shortage and manpower difficulties. Certain types of phenols are not available in sufficient quantities to meet increased requirements, WPB said.

The need for an allocation order governing maleic, fumaric, "carbic" and pentaerythritol oils and resins, was presented to the committee by WPB, who said that such an order has become necessary because of the very short supply of maleic anhydride and pentaerythritol.

WPB told the committee that the very short supply of imported fossil gums and resins, and the absence of adequate distribution controls, have made it necessary for the agency to issue directives to importers that will require them to obtain shipments of the materials for important war uses ahead of less essential uses.

Zinc to Be Allocated

Zinc will shortly join the lengthening list of metals that will again be placed under allocation because of increasing war requirements, War Production Board officials told the Zinc Producers Industry Advisory Committee. Zinc went off allocation on September 15, 1944. The new regulations are expected to follow closely the previous allocation order.

Officials of the Tin-Lead-Zinc Division said that the total indicated 1945 consumption is 1,078,000 tons of slab zinc, as compared with an indicated production, including imports, of 870,000 tons, leaving a deficit of 208,000 tons. These statistics point to an average monthly shortage of 18,000 tons, WPB said.

Coated Fabrics Tight

The urgent need for coated fabrics to fill a new Signal Corps requirement was discussed at the Pyroxylin and Vinyl Resin Coated Fabric Industry Advisory Committee at a recent meeting, the War Production Board reported.

Each coater in the industry who has any excess facilities suitable for this work should immediately notify WPB and obtain details of the new requirement, WPB emphasized. If the coated fabric industry is unable to meet this requirement, it might necessitate a review of the entire industry for the purpose of eliminating certain civilian work to provide capacity for the production of the Signal Corps needs, WPB added.

A representative of the Textile Division of WPB discussed fabric prospects. By utilizing all possible production and through considerable substitution, most military needs are being met, he said. It was pointed out that the civilian outlook is not bright for textiles for this industry.

It was the consensus of both government and military representatives that the current situation on coated fabrics is more acute now than at any time since the various programs were instituted.

Ceramic Materials Tight

Further tightening of the supply of chemicals commonly used in the production of semi-vitreous dinnerware for household use was reported by War Production Board officials at the recent meet-

C. P. Hall Names Bacon and Hummel

Wendell E. Bacon (left) has been appointed New England and Eastern representative for the C. P. Hall Co. L. G. Hummel (right) has been named secretary-treasurer of the C. P. Hall Co. in Ohio and California. Mr. Hummel, who adds the duties of treasurer to his former position as secretary of the concerns, also is secretary-treasurer of the C. P. Hall Co. of Illinois.

ing of the Semi-vitreous Dinnerware Industry Advisory Committee, WPB has reported.

Talc, used in ceramic "bodies," is particularly difficult to obtain, WPB representatives explained, because it is in great demand for use in paint for ships, tanks, and other war goods.

Pyrophyllite, another "body" material, is expected to become more readily available in two or three months, after production has been expanded, WPB representatives said.

The oxide, used in ceramic colors and glazes before the war, will remain critical until the Malay Peninsula, the principal pre-war source of tin, is again available to the Allies. In the meantime, WPB officials pointed out, none can be used by dinnerware manufacturers.

Because serious inroads have been made into the lead stockpile, WPB has had to curtail the use of lead chemicals for civilian goods.

Advisory Committee for Packaging Announced

The Quartermaster Corps has appointed an Industry Advisory Committee on packaging to assist its Subsistence and Development Laboratory. The personnel was drawn from the Technical Committee of the Packaging Institute, Inc.

Following is the membership of the Technical Committee: Chairman, Charles A. Southwick, Jr., Shellmar Products Company; Vice Chairman, F. S. Leinbach, Riegel Paper Corporation. Directors of Sub-committees: Rigid Metal Packages and Fibre Cans, Roger V. Wilson, Continental Can Company; Glass Containers and Closures, H. A. Barnby, Owens-Illinois Glass Company; Shipping Bags, Waterproof Bags, Carl Hartman, St. Regis Paper Company; Plastics and Transparent Films, A. F. Wendler, E. I. du Pont de Nemours & Company; Set-up and Folding Cartons, Walter T. Ritter, Chicago Carton Company; Machinery, John Tindal, Package Machinery Company; Adhesives and Laminants, A. B. Crowell, Jr., Union Paste Company; Converted Materials, Metal Foils, Bags (other than paper), Karl Prindle, the Dobeckmun Company; Packaged Products, T. R. Baxter, Standard Brands, Inc.; Paper Base Materials, W. H. Graebner, The Marathon Corporation; Lacquers, Coatings and Waxes, F. S. Leinbach, Riegel Paper Corporation.

R. W. Upshaw, Vice President in Charge of Manufacturing, of Anheuser-Busch, St. Louis, Mo., has been named a director of Packaging Institute, Inc., according to announcement made by Walter D. Lynch, Institute president.

Mr. Upshaw will serve as a member of the Production Division of the Institute.

Bissinger, Secretary Industrial Rayon Corp.

Frederick L. Bissinger has been elected secretary of Industrial Rayon Corp. He will continue as head of the patent department. D. S. Mallory, secretary-treasurer of the company, will continue as treasurer.

Sufficient Antifreeze

Ample supplies of antifreeze will be available to meet military and civilian requirements in 1945, the Antifreeze Industry Advisory Committee reported at a recent meeting.

While no methanol antifreeze will be available for the 1945-46 season, the supply of the permanent type of antifreeze (ethylene glycol) will approximate last season's output, WPB said.

Activities of the U. S. Conciliation Service

Situations Disposed of in the Chemical Industry

Type of Situation	1945 Feb.	1945 Jan.	1944 Feb.
Total	69	67	78
Labor Disputes	62	59	69
Strikes and Lockouts	4	6	..
Threatened Strikes	8	5	..
Controversies	50	48	..
Other Situations	7	8	9
Arbitrations	2	4	..
Technical Services	1	1	..
Special Services	4	3	..
Disputes Certified to National War Labor Board	11	11	..

HF Demand Up

Approximately 36,200 tons of anhydrous hydrofluoric acid will be required in 1945, as compared with 25,256 tons of the chemical called for last year, representatives of the War Production Board's Chemical Bureau told the members of the Hydrofluoric Acid Industry Advisory Committee, WPB reported today.

The committee was of the opinion that allocations of anhydrous hydrofluoric acid should be continued for the time being, but the members recommended that end use restrictions be liberalized as soon as the production capacity is sufficiently expanded to satisfy military and essential civilian demands, WPB said.

In view of anticipated production expansion, the committee suggested that producers of anhydrous hydrofluoric acid be permitted to explore post-war commercial possibilities of the chemical. Representatives of the Chemicals Bureau agreed with this suggestion.

Acid grade fluorspar, which is produced domestically as well as imported from Mexico and Newfoundland, is in adequate supply for the immediate present, WPB said.

COMPANIES

New Laboratory and Chemicals Plant Projected by Goodrich

Plans have been announced by the B. F. Goodrich Co. for the construction of a new research laboratory at Brecksville, Ohio. Architects have completed principal plans and designs and construction work will be started as soon as possible, according to Dr. H. E. Fritz, company research director.

The company has taken options on land near Avon Lake, Ohio, as a probable site for an experimental war chemicals plant. It is expected that construction work will be started on the unit during the next few months after government approval of the project has been obtained.

Calco Acquires Factory Site

American Cyanamid Company has disclosed the purchase of approximately 800 acres of land on the Ohio River near St. Marys, West Virginia, for its Calco Chemical Division. No immediate plans for the development of the property have been made.

Goodyear Plans Chemical Plant

The Goodyear Tire & Rubber Co. has announced plans for immediate construction of a $1,500,000 plant at Natrium, West Virginia, to manufacture a variety of new rubber-like plastics.

Titanium Alloy Increases Personnel

J. S. Geiger, formerly chief ceramic engineer for the National Tile Co., has been made research associate of Titanium Alloy Manufacturing Co. Dr. Carl Curtis, former research director of Simmons, Worden & White and American Crucible Co., has also been engaged for ceramic work. A. C. Fowler has been made chemical engineer.

$10,000,000 Expansion at Radford Ordnance

Authorization for additional construction at the Radford Ordnance Works, Radford, Virginia, has been announced by the War Department. Construction is to consist of miscellaneous buildings for greater production of explosives. The authorized expenditure is in the amount of $10,000,000.

Du Pont Boosts Nylon

Plans for construction of a new plant, near Orange, Tex., to boost nylon production for military purposes at request of the government, have been revealed by E. I. du Pont de Nemours & Co.

Work on the project, estimated to cost approximately $20,000,000, is to start immediately.

The company expects Texas production of the ingredients of nylon to begin in 12 months.

Penn Salt Penicillin Production Starts

The Pennsylvania Salt Manufacturing Co. has announced the completion of the installation of facilities for the manufacture on commercial scale of DDT. Production has already begun.

Company Notes

MONSANTO CHEMICAL CO. has started full scale production at the Duck River plant, operated for Chemical Warfare Service at Monsanto, Tenn. Costing more than $2.5 million, the new plant adjoins the company's phosphorus plant.

THE DU PONT CO. has established an export service bureau in the Empire State Building, New York, where the receptionist, Miss Maria Llaverias, will be on hand to help French and Spanish-speaking visitors.

WILMINGTON CHEMICAL CORP., 10 East 40th Street, New York, N. Y., has announced that it is now prepared to offer, in collaboration with the SYNVAR CORP., Wilmington, Del., a complete line of urea formaldehyde and phenol formaldehyde resins.

JOHN POWELL & Co. has moved its executive offices to One Park Avenue, from 114 East 32nd Street, New York City.

Chemical Company Earnings Reports Summarized

Company	Period	Taxes 1944-43		Net Profit 1944-43	
Allied Chem. & Dye Corp.	Year to Dec. 31	$20,632,606	.....	$18,025,075–	$19,023,679
Atlas Powder Co.	Year to Dec. 31	$3,177,256	.....	$1,699,917–	$1,743,133
Celanese Corp. of America	Year to Dec. 31	$11,543,500–	$10,255,000	$7,235,190–	$6,275,593
Commercial Solvents Corp.	Year to Dec. 31	$5,860,400	.....	$2,521,130	.....
Davison Chemical Corp. & Subs.	6 mos. to Dec. 25	.....	.....	$468,816–	$432,476
Dominion Tar & Chemical Co.	Year to Dec. 31	.....	.....	$671,512–	$672,724
E. I. du Pont de Nemours & Co.	Year to Dec. 31	$134,210,000–	$133,819,000	$80,870,106–	$69,707,000
Hercules Powder Co.	Year to Dec. 31	$12,018,442	.....	$4,823,855–	$5,704,511
Hooker Electrochemical Co.	Year to Nov. 30	$3,672,937	.....	$1,264,263–	$1,687,732
Mathieson Alkali Works (Inc.)	Year to Dec. 31	$1,080,000–	$1,550,000	$1,322,882–	$1,273,162
Merck & Co.	Year to Dec. 31	.....	.....	$2,235,482–	$3,592,019
Norwich Pharmacal Co.	Year to Dec. 31	.....	.....	$706,716–	$839,394
Monsanto Chemical Co.	Year to Dec. 31	$14,604,712	.....	$5,121,063–	$5,365,775
Chas. Pfizer & Co., Inc.	Year to Dec. 31	.....	.....	$2,335,083–	$1,783,772
Sterling Drug Co.	Year to Dec. 31	$8,400,000	.....	$8,121,161–	$7,806,313

NEWS *of* SUPPLIERS

F. M. de Beers, Jr. has been added to the engineering staff of **F. M. de BEERS & ASSOCIATES**, 20 N. Wacker Drive, Chicago, Ill., recently appointed Mid-Western representative of General Ceramics Co., Chemical Equipment Division, Keasbey, N. J.

Ralph J. Cordiner has been elected vice president and assistant to the president of the **GENERAL ELECTRIC CO.** with general administrative duties as designated by the president. Mr. Cordiner has been assistant to the president for the past 18 months, since his resignation as vice chairman of the War Production Board.

H. P. Thelen, formerly manager of the steel container division of the Owens-Illinois Can Company recently acquired by **CONTINENTAL CAN COMPANY,** has been appointed manager of steel container sales for Continental. G. E. DuCharme, formerly sales manager of the New York district, has been appointed manager of paint and chemical containers sales.

WALTER KIDDE & COMPANY, INC. of Belleville, N. J. has announced that they have purchased the capital stock of the Youngstown Miller Company, Inc., formerly of Sandusky, O., manufacturers of plastic coaters and oil reclaimers. F. L. Gerin will be vice-president and general manager. Other officers of the new subsidiary will be John F. Kidde, president; Harold A. Cartier, vice-president; G. Crosby Hiss, secretary, and William Deyerberg, treasurer and comptroller.

The appointment of V. H. Baker as plant manager and product engineer of **ELLIOTT COMPANY'S LAGONDA DIVISION,** Springfield, Ohio, has been made known by J. P. Rodgers, general manager of Elliott tube cleaner divisions.

THE DESPATCH OVEN COMPANY announces the opening of a new sales and field engineering office in suite 1334, La Salle Wacker Building, 221 N. La Salle St., Chicago (1), Ill.

J. D. Mattimore, director of research and development for **TUBE TURNS,** Louisville, Ky., has announced the appointment of Arthur R. C. Markl to the post of chief research engineer. Before joining Tube Turns, Mr. Markl was for fourteen years associated with the M. W. Kellogg Company, New York, last in charge of the development of equipment for oil refineries.

William E. Coakley has been elected vice-president and director of **PRESSED STEEL TANK CO.,** Milwaukee, Wis. As production manager, he is well qualified to help direct the expansion of the company's peacetime business.

CLAUDE B. SCHNEIBLE CO., Detroit, Mich., manufacturers of "Multi-Wash," equipment for dust, fume and odor control, has announced the appointment of John C. Somers, Industrial Products Engineering Co., 1 Hunter Street, Long Island City, N. Y., as its representative in the New York territory, including the states of Connecticut, New Jersey and New York.

Arthur E. Hecker, formerly vice president and general manager of **CHEMICAL CONSTRUCTION CORPORATION,** has been elected president to succeed the late W. S. Stowell.

Election of Roland P. Soule, formerly consulting engineer, as vice-president of **AMERICAN MACHINE & FOUNDRY COMPANY,** in charge of research and development, has been announced by Morehead Patterson, chairman of the board.

Fred T. Kennedy has been appointed general manager of the **BLACKMER PUMP COMPANY,** Grand Rapids, Michigan. Mr. Kennedy, until recently, has been connected with the War Production Board in Washington, D. C.

GLASCOTE PRODUCTS, INC., Cleveland, Ohio, manufacturers of glass-lined and stainless steel tanks, kettles and processing equipment has announced the appointment of Frank C. Patera as Sales Manager, replacing Mr. W. C. Dunlap, resigned.

Announcement was made by the **GENERAL CERAMICS CO.,** Keasbey, New Jersey, that their line of chemical stoneware processing equipment is now being represented in the central states by **F. M. de BEERS & ASSOCIATES,** Chemical Engineers, with headquarters at 20 North Wacker Drive, Chicago, Illinois.

C. H. Lang, **GENERAL ELECTRIC** vice president and manager of apparatus sales, has also been given the direction of application and service engineering in the company's apparatus department.

In this connection, the appointment of A. K. Bushman as manager of this department has been announced by vice president Lang.

THE HANSON-VAN WINKLE-MUNNING CO., Matawan, N. J., manufacturers of electroplating equipment and supplies, has announced the assignment of John D. Kershaw Jr., as field engineer.

THE J. C. TAGLIABUE MFG. CO., manufacturers of industrial control and laboratory instruments, has sold its assets, including goodwill, name and patents, to the **PORTABLE PRODUCTS CORP.** of Pittsburgh, Pennsylvania. The business will be operated as a separate division of the Portable Products Corp.

John E. Slaughter, Jr., vice president of **THE GIRDLER CORP.**, Louisville, Ky., in charge of the firm's Votator Division, has announced two important promotions in his organization. Sam N. Welch was named Votator's Eastern sales manager. Lamar Douglas Roy, Jr., was appointed Midwestern sales manager and will continue to make his headquarters in Louisville.

George O. Boomer has been elected President of **THE GIRDLER CORPORATION**, Louisville, Ky., succeeding Walter H. Girdler, Sr., who died on January 7. He will also remain Vice President and a member of the board of directors of the firm's affiliate.

TUBE TURNS, INC.—R. E. Fritsch, Vice President of Tube Turns, Louisville, Ky., since 1929, has been elected President, succeeding Walter H. Girdler, Sr. Mr. Fritsch continues as Vice President and a member of the board of directors of The Girdler Corporation.

Dicalite Appoints Russell Division Manager

The Dicalite Co. has announced the appointment of G. A. Russell as central division manager. Mr. Russell, formerly manager of the Kansas City office, has been connected with sales engineering involving uses of diatomaceous silica. H. L. Dunham has been made eastern division manager.

ASSOCIATIONS

Cereal Chemists Cancel 1945 Meeting

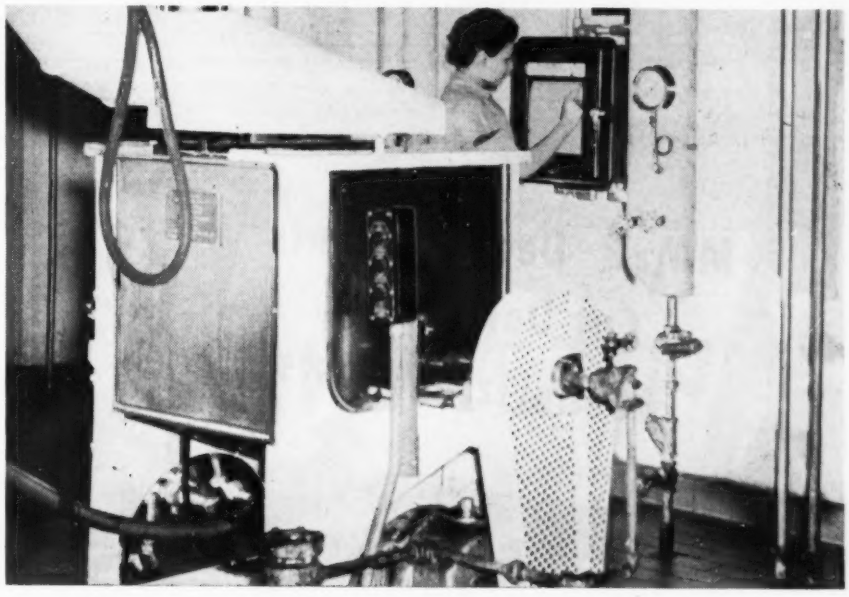
The executive committee of the American Association of Cereal Chemists has passed a resolution canceling the 1945 annual meeting, which was scheduled for the latter part of May, at Toronto, Canada, with the hope that it can be held at approximately the same time and in the same place in 1946. The committee further decided that the present officers should be continued in office until their successors have been duly elected according to constitutional procedure.

Chemists' Club Posts Nominations

The Chemists' Club, 52 East 41st Street, New York, has made known the nominations for officers for the year 1945-1946: President, Wallace P. Cohoe; resident vice-president, Chester L. Knowles, nonresident vice-president, William B. Plummer; suburban vice-president, Harry L. Fisher; secretary, Lloyd VanDoren; treasurer, Ira Vandewater; trustees (3-year term), A. G. Syska, Ralph E. Dorland; trustee (1-year term), Joseph Mattiello.

Chemical Extinguisher Association Elections

The Chemical Fire Extinguisher Association, at its recent annual meeting (March 8) held in Chicago, re-elected the following officers: president, Arthur G. Sullivan, Buffalo Fire Appliance Corporation; vice-president, J. O. Binford,



Cooking-Temperature Control At Vick Chemical Company

Cooking a batch of Vick cough drops requires hair-line temperature control—control too important to trust entirely to human hands. Micromax Recording Controllers therefore shoulder the responsibility of shutting off steam when each batch of drops reaches 290 F in the cooking kettles of the Vick Chemical Co's Philadelphia plant. While these Micromax instruments are controlling the temperature they simultaneously record it on large, detailed, quick-to-read charts—keeping a continuous record for reference. They thus do a complete job of temperature-handling—and they do it with accuracy and high dependability.

If temperature measurement or control enters into your business, let us send you Catalog N-33A covering all Micromax Controllers, Recorders, and Indicators.

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American - La France - Foamite Corp.; treasurer, Herman W. Diener, George W. Diener Manufacturing Company; and commissioner, W. J. Parker, W. J. Parker, Inc.

European Chemists Re-elect Officers

American Society of European Chemists and Pharmacists at a recent meeting re-elected the following officers: president, Dr. Henry Gildschmiedt; secretary, Dr. Benno Baecker; treasurer, Curt Simson.

Bogert Honored by Chemists

Dr. Marston T. Bogert, professor emeritus of organic chemistry at Columbia University, has been elected an honorary member of the American Institute of Chemists. Dr. Bogert, who is president of the International Union of Chemistry and a former president of the American Chemical Society, was cited "for outstanding service to the profession of chemists and the science of chemistry."

PERSONNEL

Lyden Patent Director of Penn Salt

Arvid E. Lyden has been appointed director of the patent division of the Pennsylvania Salt Manufacturing Co., according to an announcement by Dr. S. C. Ogburn, Jr., manager of the company's research and development department. Mr. Lyden, formerly connected with the U. S. Patent Office and the patent department of Allied Chemical and Dye Corp., succeeds A. E. Gibbs, who for several years has served as director of the patent division in addition to his position as advisory technical director. Mr. Gibbs will continue in the latter capacity.

Neuberg Appoints Chase Sales Director

Irving E. Chase, formerly assistant export manager for Magnus, Maybee & Reynard, Inc., has been made director of sales of the William D. Neuberg Co.

Greenewalt Assistant Director du Pont Development Department

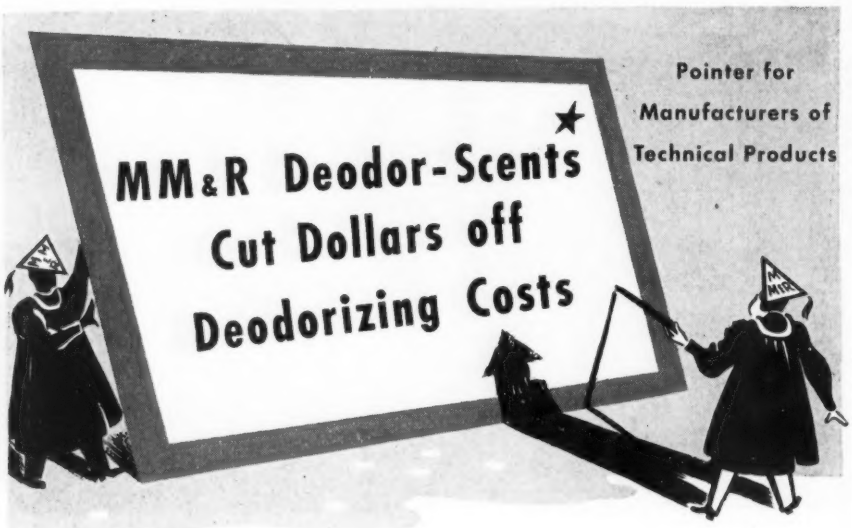
Dr. C. H. Greenewalt has been appointed an assistant director of the development department of E. I. du Pont de Nemours & Co., according to Dr. E. K. Gladding, director of the department. Since January 1, 1943, Dr. Greenewalt has been technical director of the explosives department, assigned to special war work. He will now be in charge of activities in which technical considerations predominate, while H. F. Ford, also an assistant director, will be in charge of the more commercial type of activities.

American Aniline Names Bush to Head Branch

American Aniline Products, Inc., has appointed E. K. Bush as manager of its Providence branch. Mr. Bush was for many years employed as technician and dyeing superintendent of printing and finishing plants and subsequently joining the New York staff.

Mines Bureau Reassigns Smith and Fowler

The reassignment of N. A. C. Smith, supervising engineer of the Bureau of



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Deodor-Scent Vanilla M M&R
MM&R Deodor-Scents Type B
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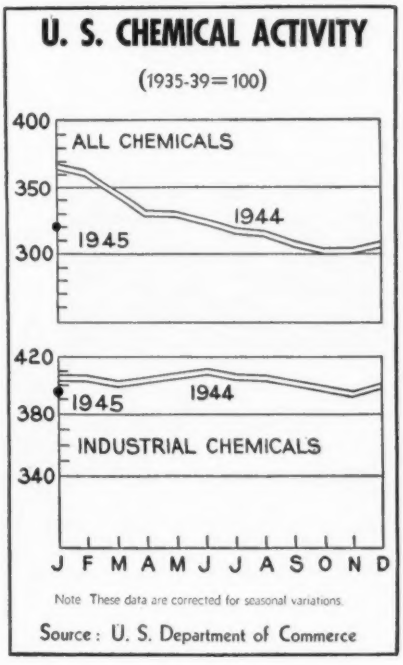
San Francisco: Braun-Knecht-Heimann Co. • Canada: Richardson Agencies, Ltd., Toronto

Mines Petroleum Experiment station at Bartlesville, Okla., and the transfer of H. C. Fowler, assistant chief of the Bureau's Petroleum and Natural Gas Division, Washington, D. C., to the position of Bartlesville supervising engineer, have been announced by Dr. R. R. Sayers, director of the Bureau.



Three Engineers Move to Commercial Solvents

Fred W. Schmitz, formerly employed in the chemical engineering department of the Missouri School of Mines and Metallurgy, has joined the research staff of Commercial Solvents, where he will do pilot plant work and process engineering. Charles A. Stringfellow and Donald W. Jeffries from Rose Polytechnic Institute and Harvard University, respectively, will assist in calculations on new processes and plant design in the engineering division at Terre Haute, Indiana.

SPEAKERS

Dr. L. M. Pidgeon, who discovered the process by which Canada is producing magnesium from dolomite, spoke recently on the commercial uses of magnesium at a meeting of the Royal Canadian Institute at the University of Toronto, Canada. Dr. Pidgeon is head of the department of metallurgical engineering at the University of Toronto.

Foster Dee Snell, president of Foster D. Snell, Inc., Brooklyn, N. Y., on a recent tour in the Midwest addressed the Wabash Valley, Kalamazoo, Midland, Michigan State College, Toledo and Detroit Sections of the American Chemical Society; the American Institute of Chemists at Dayton, Ohio; and the Will County Chemical Society of Joliet, Illinois, on the subject "The Factors in Detergency." Dr. Snell also spoke to the Indianapolis section of the American Chemical Society on the subject "What the Consulting Chemist Does."

Dr. Robert P. Fischelis, newly elected secretary of the American Pharmaceutical Association, spoke March 12 on "The Aims and Objectives of the American Pharmaceutical Association Today," at the monthly meeting of the New York branch.

Chaplin Tyler of E. I. du Pont de Nemours & Co. will speak before the Junior Chemical Engineers of New York on "Some Personal Aspects of Professional Development," April 25.

Personnel Notes

W. L. Badger has resigned his position as manager of the consulting engineering division of Dow Chemical Co. to go into private consulting work. He is still giving a portion of his time to Dow problems, but is also accepting certain outside connections.

Dr. W. Albert Noyes, Jr., professor of physical chemistry in the University of Rochester, has been elected a regional director of the American Chemical Society representing the New York-New

CHEMICAL KESSCO PRODUCTS SPECIALTIES

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Jersey area. He succeeds DR. ROBERT E. WILSON, president of the Standard Oil Company of Indiana, who resigned.

THOMAS W. HARRIS, formerly an executive with Basic Magnesium, Inc., Las Vegas, Nev., has joined the staff of Wilson & George Meyer & Co., as assistant to T. H. Lathe, manager of the Agricultural and Industrial Chemical Department.

DR. HARRY J. PREBLUDA has been designated manager of special products sales by U. S. Industrial Chemicals, Inc. ROBERT K. RIGGER, formerly with USI's Technical Development Laboratory, will be his assistant.

J. D. FAIELLA will direct the new Plastolein products department of Emery Industries, Inc., Cincinnati, Ohio. He has previously been connected with the Mellon Institute.

DR. RALPH T. K. CORNWELL, director of research for Sylvania Industrial Corp., Fredericksburg, Va., has recently been elected to the Board of Directors of that company.

GEORGE SCHNEIDER, a vice-president of Celanese Corp. of America, has been elected to the board of directors.

PHILIP E. CALO, affiliated as a partner of John H. Calo Co., will control the Chicago office division, which will be known as Philip E. Calo Co.

DR. JOHN G. HILDEBRAND, JR., for ten years a member of the staff of Gustavus J. Esselen, Inc., was recently elected vice-president of the organization.

DR. HENRY DE LASZLO of L. Light & Co., Ltd., Wraysbury, Bucks, England, is visting the United States for several months for the purpose of arranging imports of organic intermediate chemicals into England. Dr. de Laszlo is staying at 27 West 86th Street, New York City, and is anxious to get in touch with manufacturers of intermediates who are interested in exporting to England.

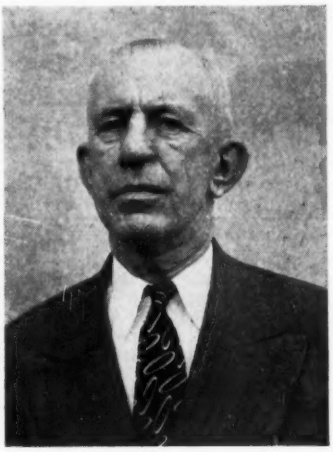
M. A. KIMMEL of American Resinous Chemicals Corporation has been placed in charge of adhesives department sales and development. He was formerly in the general sales department of the company. He will be in charge of sales of adhesive materials for the Newark, Chicago and Los Angeles Divisions.

GEORGE S. BARR has been elected chairman of the board of the Dearborn Chemical Co., to succeed the late Robert F. Carr.

CHARLES WESTENBERG has resigned as assistant manager of Charles Tennant, Seres & Co., to become affiliated with the Millmaster Chemical Co.

WILLIAM M. RUSSELL has been appointed branch manager for the Detroit territory of the organic chemicals division of Monsanto Chemical Co.

Robison Joins Western Precipitation Corp.



Sidney J. Robison, recently retired from his position as chief engineer of the Universal Atlas Cement Co., and has joined the staff of the Western Precipitation Corp., where he will devote his time to special problems relating to the adaptation of Cottrell Precipitators and Multiclones in the heavy industries.

H. M. FISHER has joined the research staff of the Foote Mineral Co. Mr. Fisher, formerly associated with Atlantic Refining Co., will head the grease research group.

ARTHUR SCHRODER will take up his new duties as executive director of the American Institute of Chemists, May first.

MAJOR T. L. MCNAMARA, recently of the Chemical Warfare Service, is joining the Phillips Petroleum Co., where he will be in the process engineering division.

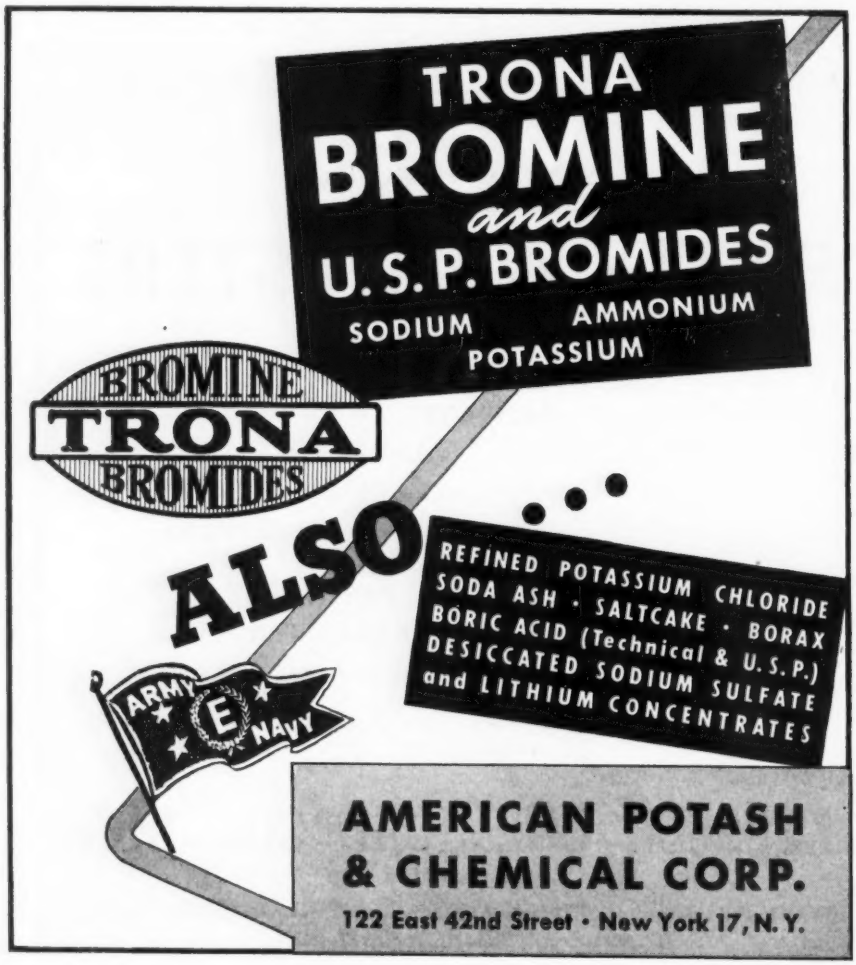
OBITUARIES

EMIL CARL LESSER, retired chief chemist of the American Dyewood Co., died March 6 in the Park East Hospital, New York, at the age of 83. He developed the process of obtaining synthetic dyes from hematoxylin in research at the Massachusetts Institute of Technology.

GEORGE W. LEWIS died in Asbury Park, N. J., on February 1. Mr. Lewis has been assistant manager of the laboratory chemical division of Merck & Co.

WILLIAM MITCHELL GARDELLA, sales development engineer of Oliver United Filters, Inc., died at Springfield, Ohio, on January 26.

H. R. SMALLEY, soil chemist, chief agronomist and director of soil improvement work of the National Fertilizer Association, died February 27.



Between the Lines

(*Continued from page 610*)

tries may endeavor to export overseas anyway, in order to build up foreign exchange. They will then find some of their pre-war markets abroad contracted by the development of local glass industries. Several countries for instance, among them, Brazil, Chile, and Argentina, are now equipped to supply most, if not all of their own requirements for sheet glass.

For this reason the various factors enering into the relative competitive positions of United States and European industries after the war are pertinent, and particularly as they reach back into the chemical field. The Tariff Commission states that these relative positions will depend on many imponderables, such as comparative wage rates, comparative currency values, the existence or nonexistence of cartel agreements (the Commission has gone extensively into this particular situation) and others.

"Unless factors of this kind should be markedly more unfavorable to the United States industry than in the immediate prewar period," the Commission experts have reported, "imports are not likely to be a very much more important factor in the domestic market at existing rates of duty than in that period.

"With substantial reductions of duty, particularly if accompanied by high construction activities, imports might increase considerably compared with 1937-39; whether they would come to constitute as large a proportion of domestic production as in the middle 1920's before the domestic industry was fully mechanized, is doubtful."

The ability of foreign producers to reenter the United States market after the war, it is believed, will depend in part on their production costs as compared with those of United States manufacturers, of which wage rates are, of course, a significant element. It happens that wages in the glass industries of both the United States and Belgium advanced materially in the 10 years up to 1939, and during the war there have been further increases in United States wages.

The war has brought little change to the American sheet-glass industry, either in methods of production, capacity, or the units comprising the industry. It is maintaining an exceptionally high level of production, the figures show, yet at no time has it utilized more than 85 percent of its real capacity.

The industry has encountered occasional shortages of chemicals, fuel, and manpower, but these difficulties are said not to have been serious as compared with other industries.

In 1943 there were in the United States 7 glass companies, producing sheet glass in 12 plants, located in West Virginia, Pennsylvania, Ohio, Oklahoma, Louisiana, Arkansas, and Indiana. West Virginia is stated to be the largest producing state, accounting for approximately 40 percent of the total U. S. output. Up to 1943, according to figures furnished the Commission, more than 75 percent of the total output was produced by three of these companies.

Most of the large sheet glass companies operating today in western Pennsylvania, West Virginia, and Ohio have easy access to abundant sand deposits, and until recently have had an ample supply of natural gas as fuel. Natural gas is the principal fuel used in glass making in the United States, and is said to be not only usually cheaper than other fuels but produces a more uniform heat. However, in some sections of the country where the cost of natural gas is prohibitive, glass manufacturers use so-called producer gas, from coal, coke oven gas, or oil.

Two of the largest companies are said to either own completely or to be financially interested in raw material plants and gas wells from which they obtain a large part of their requirements. Generally speaking, however, adequate nearby supplies of both raw materials and fuel have been available.

As can be readily realized, during this war, shortages of natural gas have devel-

(*Turn to page 689*)

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CHEMICAL SPECIALTIES NEWS

WFA Announces Personnel Changes

The War Food Administration has announced the retirement of Dr. Curtis C. McDonnell and the appointment of Dr. W. G. Reed as chief of the Insecticides Division in the Livestock and Meats Branch, Office of Marketing Services. Dr. McDonnell's retirement and Dr. Reed's appointment were effective March 1, 1945.

Dr. McDonnell has served with the U. S. Department of Agriculture since his appointment as assistant chemist in the Bureau of Chemistry in 1907. Since 1928 he has been chief of the Insecticide Division, which until 1940 was under the Food and Drug Administration.

Dr. Reed has been with the USDA since November 18, 1929. Following his graduation from the Chicago Veterinary College with a doctor of veterinary medicine degree in 1918, he carried on a general veterinary practice in Marble Rock, Iowa, until he entered the USDA. In 1931 he entered the meat inspection service where he has held a number of important technical and administrative positions.

Penicillin Given by Oral Administration

Lederle Laboratories, Inc., a subsidiary of the American Cyanamid Co., recently announced a successful means of administering penicillin by mouth.

The drug is suspended in cottonseed oil and enclosed in a gelatin capsule. Although the capsule dissolves in the stomach, the penicillin is preserved by the oil from deterioration by gastric acids. Digestion of the oil in the small intestine liberates the penicillin for absorption into the blood stream.

Another means, described in the Journal of the American Medical Association, involves the simultaneous administration of trisodium citrate. This salt is said to prevent the destruction of the drug in the stomach.

These developments take on added significance with the release of penicillin to civilians. The War Production Board made 1,280,000 vials available in March and will allocate 1,500,000 vials through April and succeeding months. Each vial contains 100,000 Oxford units, which is the normal dose.

Penicillin to Civilians

W.P.B. has announced that as of March 15 penicillin has been released to civilians through regular pharmaceutical and chemical channels. Hitherto such distribution was rigidly controlled through the hospital depot plan. This decision to release civilian penicillin through normal channels was brought about due to the increased production of this drug and will be supplied for this purpose only after military demands have been met.

Cross Manages Minnesota Mining Division

Bert S. Cross was recently made general manager of the "Scotchlite" division of Minnesota Mining & Manufacturing Company, St. Paul, Minnesota.

Fertilizer Capacity Increased

International Minerals and Chemical Corporation is adding a $125,000 acidulating plant to its Chicago Heights, Ill., fertilizer factory for the manufacture of superphosphate, according to Louis Ware, president.

The addition, which will come into production about March 15, is expected to increase the capacity of the Chicago Heights plant 25 to 30 per cent over present tonnage and will allow the corporation to expand its fertilizer business in Illinois, Indiana, Michigan, Wisconsin and Iowa, the states served by the plant.

Mr. Ware also announced that the corporation plans to build two additional fertilizer plants in the Midwest to serve this territory when materials are available.

The present addition to the Chicago Heights plant is the second since the plant was built in 1938.

Protein Pharmaceutical Production Increased

Production of the amino acid parenteral, Parenamine, is being doubled by the Frederick Stearns & Company Division, Sterling Drug, Inc., Detroit, Michigan.

This marks the second time production on this product has been doubled during the past 18 months.

New company literature on Parenamine describes it as a 15 per cent solution of amino acids derived from the acid hydrolysis of casein and fortified with *dl*-tryptophane. It contains all of the essential amino acids plus other amino acids native to casein, adding that "as a source of protein nutrition, it is very economical, costing but a fraction of an equivalent amount of protein administered as plasma."

In the new booklet, complete bibliography is furnished on clinical uses of Parenamine before and after surgery as a therapy in poorly healing wounds, ulcers and burns, diseases of the gastro-intestinal tract, nutritional edema, allergy, liver disease, nephtosis, pregnancy and lactation, and anemia.

William R. Warner Reorganizes

According to an announcement of Dr. Marvin R. Thompson, president of William R. Warner & Co., Inc., new marketing plans have reached the stage of setting up an entirely separate operating company, Standard Laboratories, Inc., to control and market the products of the numerous proprietary drug and toiletry organizations acquired by the parent concern over a period of years.

Under the leadership of Erwin Fauser, former president and general manager of Frederick Stearns & Co. (Detroit), more than two hundred products of fourteen different proprietary companies will be aggressively merchandised as preparations of Standard Laboratories, Inc. Independent operation of the new proprietary set-up is expected to begin July 2, 1945.

Wyeth Open Baltimore Office

Wyeth, Inc., of Philadelphia, subsidiary of American Home Products Corp., has opened a branch office and warehouse in Baltimore to handle distribution of products throughout Maryland, Virginia, West Virginia and the District of Columbia.

Cosmetic Tax Defined

The Treasury Department has recently issued to Collectors of Internal Revenue a list of cosmetics which the Department considers taxable as toilet preparations. The Department indicated that the list should be considered merely illustrative and all not inclusive. In any case where the taxability of any particular article is in question, a sample of the product or a quantitative formula to-

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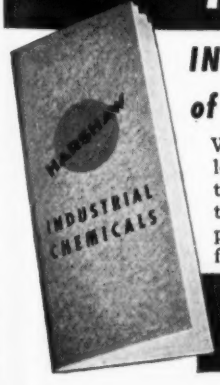

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gether with labels and other advertising material should be submitted immediately to your local Collector of Internal Revenue for an official ruling.

Chicago Association Elects Officers

The Chicago Perfumery, Soap and Extract Association has elected officers for 1945: Fred A. Degener, president; Walter R. May, vice-president; Carl Edwards, secretary, and Martin Vance, treasurer.

Prufcoat Opens Branch Office

Norman E. MacCuspie, president of Prufcoat Laboratories, Inc., of Cambridge, Mass., has announced the opening of a new branch office at 50 East 42nd Street, New York City, and the appointment of David E. Long as general manager in charge of sales and service-engineering. Mr. Long will make his headquarters in the New York branch office. The Prufcoat Laboratories specialize in acid-proof, alkali-proof and waterproof protective coatings for industry.

Sterling Drug Leases Property

Sterling Drug Co., Inc., has leased the 43-story Continental Building, 1450 Broadway, for a term of ten years, subject to existing leases, it was announced by James Hill, Jr., president. The deal was made through Brown, Wheelock, Harris, Stevens, Inc.

The building will house offices of the company, presently located at 170 Varick Street, as well as seven divisions and subsidiaries which are located in other parts of New York.

Some divisions of Sterling will move into the new building immediately, Mr. Hill said, but due to existing leases, the major portion of the building will not be occupied by Sterling for several years.

A. H. P. Negotiates For Serum Company

American Home Products Corporation is negotiating for the purchase of the Fort Dodge Serum Co., Fort Dodge, Ia., it was announced recently by Alvin G. Brush, chairman of the former firm.

The Fort Dodge concern produces a complete line of veterinary biologicals and pharmaceuticals.

Pharmacopoeial Convention Elects Swain

The board of trustees of the United States Pharmacopoeial Convention recently elected Dr. Robert L. Swain chairman to fill the vacancy caused by the death of Dr. E. F. Kelly, former chairman. Dr. Swain was elected to the board in 1936 and re-elected in 1940.

National Starch Promotes Pascal

National Starch Products, Inc., announces the appointment of Donald D. Pascal to the managership of its Midwestern Division with headquarters at Washtenaw Avenue and 36 Place, Chicago, Ill.

Mr. Pascal joined the original National Adhesives organization 15 years ago, advancing through the laboratory and service departments to become, in turn, manager of the Philadelphia branch, director of technical service, and more recently, technical assistant to Chester A. Gage, vice-president in charge of sales.

He is a graduate of Brooklyn Polytechnic Institute and an active member of many trade associations.

Bohan Promoted By Sterling Drug

Joseph D. Bohan was recently elected a vice-president of Sterling Drug, Inc., in charge of its Centaur Company Division. Formerly a divisional vice-president, Mr. Bohan succeeds Harold B. Thomas who resigned to become a partner in the advertising agency of Pedlar & Ryan, Inc.

Bohan has been in the drug business for 22 years, and with Centaur for 13 years. He joined Centaur in 1932 as export manager, later becoming general sales manager and vice-president.

Nuodex Acquires Chicago Property

Acquisition of a plant and railroad siding at 19th Street and So. Washtenaw Avenue, Chicago, Illinois, by Nuodex Products Co., Inc., chemical manufacturers of Elizabeth, New Jersey, was made public today by Mr. Walter Gotham, vice-president in charge of production.

It is expected the plant will be put in operation within the next few months depending on the availability of the necessary equipment. When improved it will add some 40,000 square footage of floor space to the steadily expanding Nuodex interests who now have plants in Toronto, Canada, and Sydney, Australia, in addition to the parent plant in Elizabeth, New Jersey.

Powell Expands Offices

John Powell and Co. has moved its executive offices to larger quarters at One Park Avenue, just across the street and north of 114 East 32nd Street, where it will continue to maintain its Export Dept., Technical Sales Dept., and laboratories. This move enables the Powell organization to enlarge its laboratory facilities to twice that formerly used by its chemical and biological laboratories.

Ziegler Appoints Chicago Representative

Gordon S. Ziegler, general manager of G. S. Ziegler & Co., one of the country's largest producers of pitch and asphalt compounds, announces the appointment of Fred A. Jensen & Co. as Chicago representative.

Mr. Jensen will represent G. S. Ziegler & Co. in the sale and distribution of Gilsonite; stearine, cottonseed, palm and tall oil pitches rerun to specification; amorphous waxes and special compounds.

Union Ink Completes New Factory

In order to expand its operations, the Union Ink Co., Inc., has moved from East Rutherford, N. J., to 455 Broad Ave., Ridgefield, N. J., where it has completed its new factory.

Tarbet in New Post at A. H. P.

C. W. Tarbet, active in American Home Products Corporation since its organization in 1926, has been appointed an assistant to Walter Silbersack, executive vice-president and general manager of the corporation, Mr. Silbersack announced recently.

For many years, Mr. Tarbet was president of the Kolynos Company and the BiSoDol Company, subsidiaries of A. H. P. During this period, he directed export operations for all American Home Products Corporation companies.

In his new position, Mr. Tarbet will have charge of administrative matters concerning the corporation's chemical units and engineering department.

Barker Accepts Post with Wipe-On

The Industrial Research Division of the Wipe-On Corporation, New York City, has retained Charles A. Barker as insulation engineer in charge of technical ap-

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Lower Profits Seen By Drug Firm Heads

The drug industry—manufacturers, retailers and wholesalers alike—must look forward to a postwar period of lower margins of profit, George Van Gorder, first vice-president of McKesson & Robbins, Inc., told a recent conference of executives of the nationwide wholesale drug firm.

Wilbur E. Dewell, vice-president in charge of manufacturing, predicted that 1945 may be the most difficult the industry has experienced in the supply of merchandise. With fewer sundries available, the druggist will have to concentrate on his original business, selling "the materials of good looks and good health."

Constans Ceramic Engineer at Orton

The Edward Orton, Jr., Ceramic Foundation announces the appointment of Eldon G. Constans as ceramic engineer. Mr. Constans will be attached to the staff at Columbus, Ohio. Mr. Constans will carry on research work in the further development of the use of standard pyrometric cones for the firing of ceramic wares. His appointment makes it possible for the Foundation to do some intensive research work at this time. He leaves the Curtiss-Wright Corporation as a project coordinator in the Columbus plant to take over his new work.

Rumford Elects Directors

At the annual meeting of stockholders of Rumford Chemical Works, held on February 21 in the company offices at Rumford, Rhode Island, the following directors were elected: D. B. Curll, Jr., Major Gardiner Fiske, G. Burton Hibbert, J. Whitney MacDonald, A. E. Marshall, George W. Penny, Jr., Dr. Frederick Prime, and Frank N. Phillips.

The newly elected Board of Directors re-elected A. E. Marshall chairman of the board and president, Frank A. Staples, treasurer, and Benjamin Baylis, secretary.

Electrostatic Enamel Spraying

One of the more serious problems that has always confronted the porcelain enameling industry has been that of overspraying.

Several years ago the Harper J. Ransburg Company, of Indianapolis, confronted with this same problem in the application of paints and varnishes, conceived the idea of applying the principles of electronics to automatic spraying and achieved a major success.

In July of 1944 equipment necessary for tests and experimentation with porcelain enameling was set up at the Pemco plant in Baltimore and a clearly defined program, under the supervision of the Pemco Research Division, was put into effect. The technical data accumulated during these tests definitely proved that electrostatic spraying is satisfactory in porcelain enameling and when properly used a uniformly coated product with the minimum of overspraying is obtained.

Technical matter concerning these tests as well as costs and availability of the apparatus can be secured from the Ransburg Company in Indianapolis or through the Pemco Corporation, Baltimore 24, Md.

Evans Representative Here

Thomas G. C. Hendy, general manager of Evans Chemicals, Limited, London, arrived in New York on February 5th for a month's stay with Evans Chemetics, Inc., New York. Mr. Hendy was here on liaison work in connection with the postwar development of the European plants of Evans Chemetics, Inc., and their associated companies.

While in this country, Mr. Hendy has made arrangements for the manufacture of private-brand cosmetics in England for American companies after the war.

Martin to West Coast

John H. Martin, since 1935 secretary of the Winthrop Chemical Company, Inc., 170 Varick Street, New York, and Rensselaer, N. Y., has been assigned to new duties effective immediately in the Pacific Coast office of the company, 860 Second Avenue, San Francisco, it is announced by Dr. Theodore G. Klumpp, president. No successor as secretary has as yet been named, Dr. Klumpp said.

Anti-Freeze Properties of Laevo 2,3-Butylene Glycol

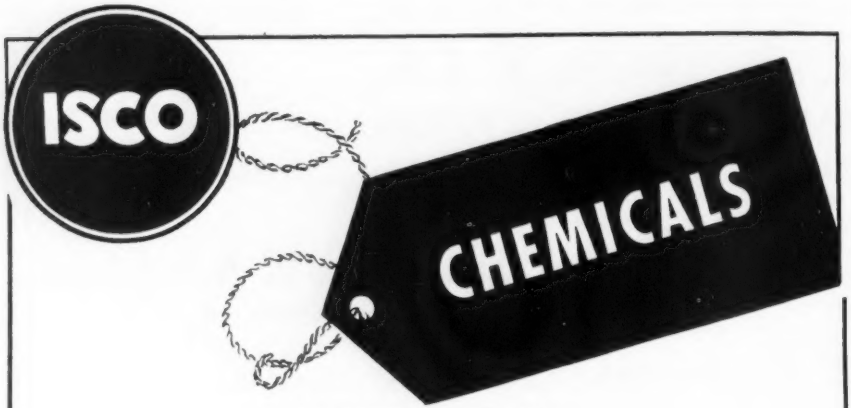
The availability of *laevo* 2,3-butylene glycol makes its use as an anti-freeze appear attractive.

The freezing of aqueous solutions are as follows:

% glycol	*Temp. ° F.*
20	21
40	— 4
50	— 24
60	— 40
70	— 40
80	— 13
90	16

The curve is similar to that for ethylene glycol-water, the chief difference being that the latter affords protection down to — 58° F.

The viscosity of the aqueous solutions is considerably higher than of ethylene glycol of corresponding concentration.



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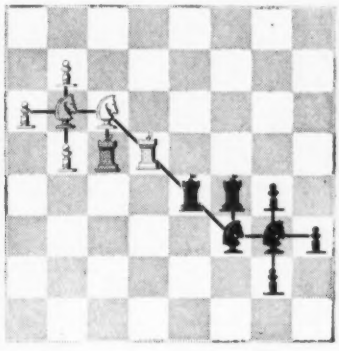

Perhaps chess was played before Brodie first began his investigations of Acetyl Peroxide in 1863; and certainly prior to a continuation of his studies by Vanino, Clover, Richmond, Gambarjan and Kharash. But its use was more risky than playing chess, for Kharash said of Acetyl Peroxide in the Journal of the American Chemical Society: "An outstanding peroxide of great usefulness but must be used on the spot (of manufacture) because of its sensitivity."

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Besides its value as a polymerization agent, other interesting applications include its use as a germicide, a bleaching and oxidizing agent, and in vulcanization. It has great possibilities in organic synthesis as it is very reactive and offers a source of active oxygen in a non-aqueous medium.

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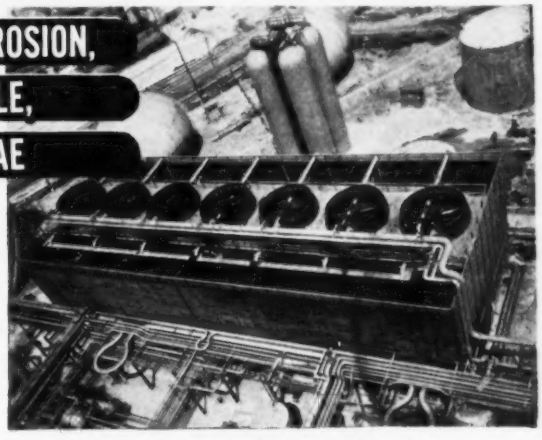

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3. The cost entailed is negligible insofar as finished product cost is concerned.

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FACTORIES AT CLIFTON, N. J. AND SEILLANS (VAR) FRANCE

60% butylene glycol has a viscosity in centistokes of 10.8 at 20° C. and 1000 at —30° C., whereas 60% ethylene glycol has value of 4.7 and 62.6 at these two temperatures. Ethylene glycol solutions undoubtedly have more favorable viscosity characteristics, but it is difficult to say how important this will prove in the competitive field; no objections have been raised to butylene glycol solutions on this score in practical driving tests which have extended over this winter's lowest temperatures in Ottawa, reaching —27° F.

Butylene glycol has a boiling point of 178° C., which ensures that it will not boil off. Barring leaks, water is all that need be added during the winter driving season, just as with ethylene glycol.

Aqueous butylene glycol has little effect on the metal parts of the cooling system, although there is some tendency to attack lead and tin. A corrosion inhibitor will serve a useful purpose in such solution just as when ethylene glycol is used, but it must be remembered that weather itself has a corroding action and yet no one seems to become concerned about this except in the winter driving season. Of all commercially used antifreezes calcium chloride is the only one which introduces really serious corrosion problems.

Little difference has been found between ethylene and butylene glycol as far as effects on rubber hose connections. The heat capacity is also of the same order so there should be little difference in their cooling properties.

For the testing of used radiator fluids for glycol concentration, density may be used in the case of ethylene, but is not possible in the case of butylene, since its density is the same as water.

Nordone Assigned Buffalo Territory

Paisley Products, Inc., of New York, announce the appointment of A. R. Nordone as Western New York sales representative, located at 423 Eggert Road, Buffalo 15, New York. To provide improved technical service to industrial adhesive users in his new territory, New York State west of Syracuse, Mr. Nordone has just completed an intensive training period at the Paisley New York laboratories.

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WAR REGULATIONS SUMMARY

ALKYD RESINS—(WPB) Special consideration will be given to requests for use of off-grade or obsolete phthalic alkyd resins. Applications for such material should be made on Form WPB-2945. The applier must define clearly the nature of the resin, wherein it differs from the standard, and why it cannot be used for its original purpose. If it cannot be used for important military needs, every effort will be made to place this material where it is most essential in the civilian economy.

CALCIUM HYPOCHLORITE—(WPB) Allocation control of high test calcium hypochlorite was transferred from Order M-19-a to Schedule 93 of Order M-300. The former order, also covering chloride of lime, was revoked. A monthly small-order exemption of 45 lbs. was provided for the hypochlorite; there was no exemption before.

CHLORATES—(WPB) Minor chlorates, such as barium chlorate and perchlorate, have been removed from allocation. Order M-171 (Chlorate Chemicals) has been revoked and the affected chemicals transferred to M-300. Small-order exemptions have been raised from a uniform 25 lbs. to 250 lbs. for potassium chlorate, 300 for sodium chlorate, and 100 for potassium perchlorate.

CHLORETHYLENES—(WPB) Order M-371, covering trichlorethylene and perchlorethylene, was revoked and controls transferred to Order M-300. Small order exemptions were reduced from one drum to less than one drum. Schedule 95 (perchlorethylene) reduces from 10,000 to 7,000 lbs. per month the quantity which may be supplied before the customer is listed on Form WPB-2947. Schedule 94 (trichlorethylene) reduces the corresponding quantity from 10,000 to 3,250 lbs.

COPPER—(WPB) Amendments to Order M-9-c restrict the use of copper in many products. About 10 per cent less is available for second-quarter allotments by the Consumers Durable Goods Division.

COTTON LINTERS—(OPA) Maximum price of linters rejected for chemical use has been established at 3.23c per lb. at the mills and 3.55c from dealers. Establishment of a maximum will prevent their sale as free linters and channel more into the chemical industries.

ESTER GUM—(OPA) Base maximum price of ester gum containing gum rosin has been increased from 11.5c per lb. to 11.85c.

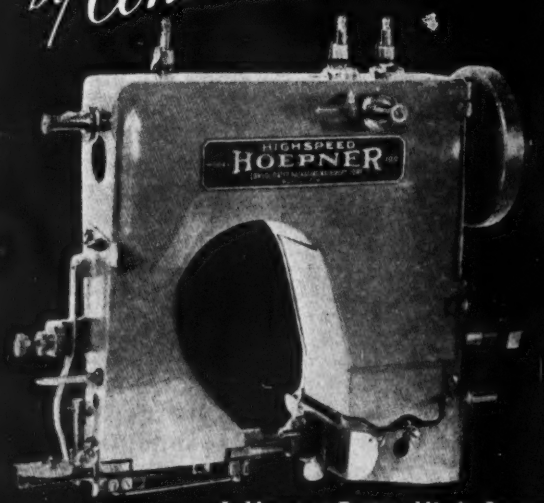
NATURAL RESINS—(WPB) Schedule 96 of Order M-300 was issued to control the allocation of natural resins. All use and delivery must be authorized by Form WPB-2947. End-use certification is required for all orders for delivery in aggregate of more than 160 lbs. per month.

PHENOLIC RESIN—(WPB) Small-order quantities of phenolic resin and molding compound may be accepted by manufacturers to complete jobs for which materials had been specifically allocated. This amendment to Schedule 87 of Order M-300 relaxes the restriction that exempt small orders could be used only for experimental purposes if additional quantities were received during the same allocation period on specific authorization.

ROSIN—(WPB) Order M-387 was issued, establishing quotas of rosin that may be used in the production of all but "preferred orders" (military, governmental, Lend-Lease, etc.).

(OPA) Maximum prices of solros and limed rosin, both processed from wood rosin, were increased. Producer's maximum price of solros is increased from $3.90 to $4.10 per 100 lbs. Producer's price of limed rosin in his price for the wood rosin being limed plus 20 to 30c per 100 lbs. depending on the lime content.

The HOEPNER Sewing Head by Consolidated



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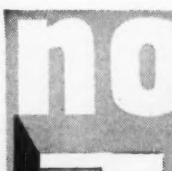

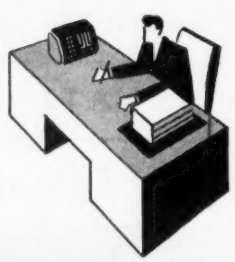

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CANADIAN NEWS

by W. A. JORDAN

Outlook for Canada as a Market for U. S. Chemicals

Home industry is now capable of supplying about half of Canada's normal chemical requirements, but the Dominion will still need more chemicals from U. S. than it bought in 1939.

WITH foresighted chemical companies once again giving serious attention to the almost forgotten word "sales," a preliminary consideration seems warranted as to the postwar outlook for Canada as a market for chemicals made in the United States.

First off it must be realized that the Canadian chemical market is small compared with the U. S. domestic market, so that comparison of actual consumption figures do not make a very impressive picture. Canada has roughly only about one-twelfth the population of her southern neighbor, and has not progressed as far along the path of industrialization.

But relative to other U. S. chemical export markets, Canada looms large. In normal times she is the United States' largest single chemical customer. The 1940 Canadian market for U. S. chemicals was greater than that of all South America, four times that of Brazil alone, and almost equivalent to the total of South America, Australia, and New Zealand, combined.

Last year the Dominion's chemical imports, some 90 per cent of which originated in the U. S., amounted to $81,000,000. Admittedly a heavy and essentially undisclosed percentage was straight wartime business, but even in 1939 Canada's imports from the U. S. of $29,000,000 topped the U. S.'s second best customer, the United Kingdom, by $7,000,000.

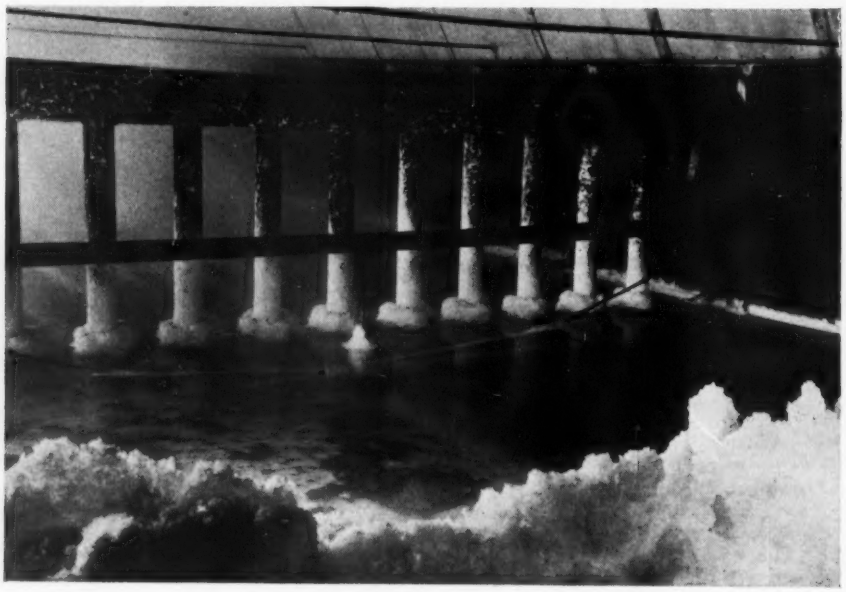
The prewar year of 1939 cannot, of course, be regarded today as "normal." Since that time the Dominion has progressed far in an industrial sense, and thereby in chemical consuming capacity. Therefore, although a precise estimate cannot be made, it is justifiable to believe that postwar imports of chemicals will exceed 1939 values and tonnages.

The Canadian chemical industry, which is devoted primarily to supplying domestic needs, is capable of accommodating about one-half Canada's normal chemical requirements. Of necessity, in the light of relatively limited demand for some chemicals, it is not endowed with the diversity of the U. S. industry. Imports, therefore, do not basically compete with made-in-Canada chemicals; rather they are complementary, and most Canadian chemical producers also act as distributors for imported lines. Such items are, naturally, those chemicals which cannot be made in the Dominion economically and are more advantageously imported from larger-scale, lower-unit-cost, U. S. producers.

That situation obtains especially today. After the war it is evident that British exporters will appear on the scene to compete for the Canadian market. However, U. K. chemicals in the past have never amounted to more than a moderate percentage of U. S. imports.

During the war the Canadian chemical industry has grown substantially, but more vertically than horizontally. Canadian import needs have changed, and are changing constantly, but the Dominion's top-ranking imports still remain remarkably similar to those of prewar days. High in the current list are synthetic resins, vegetable and essential oils, waxes, titanium oxide, carbon black, ethylene glycol, sulfur, magnesium sulfate, xanthates, tartaric acid, and many fine chemicals.

All indications are that even as the Canadian chemical industry develops, imports of chemicals will also increase in proportion to the nation's progress. And, barring unforeseen and currently improbable tariff changes, some 70 per cent of postwar Canadian chemical imports will be brought in from her good neighbor, the U. S.



Discharge end of open evaporator pan showing salt being recovered from brine at the Windsor Salt Works of Canadian Industries Limited. Total salt production of Canada is 650,000 tons annually, mostly from Ontario.

Nichols Making C.P. Acids

The Nichols Chemical Company, Ltd., Canadian subsidiary of General Chemical Co., has just brought into production at Sulphide, Ontario, a new unit for the manufacture of c.p. hydrochloric, nitric, and sulfuric acids, and ammonium hydroxide. This development marks the first time that such reagents have been manufactured on a commercial scale in Canada, for heretofore the Dominion has been exclusively dependent on imports from the U. S. for these reagents, and, as a matter of fact, for most reagent chemicals.

The Nichols unit operates essentially as a purifying plant for its own commercial grade, pyrite-based sulfuric, and distills purchased hydrochloric and nitric. Although Nichols did manufacture nitric prior to the war, its own plant has been closed for several years due to the non-availability of adequate supplies of sodium nitrate. No definite plans as to its reopening have been made.

Prior to the establishment of its new facilities Nichols had distributed Baker

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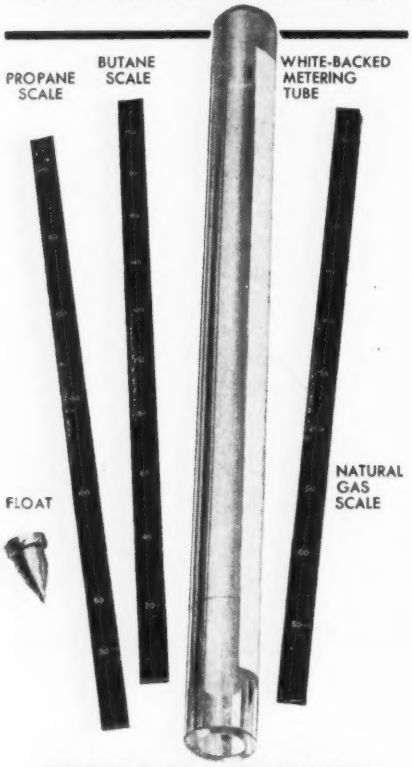
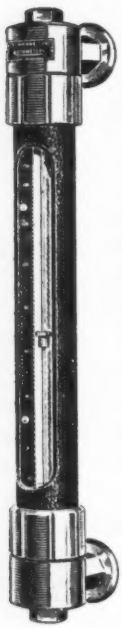


INTERCHANGEABILITY



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Write for Publication 4135

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& Adamson laboratory chemicals in Canada. Henceforth it will continue to handle the general B & A line, with domestically produced acids and ammonia replacing the imported reagents.

Institute to Meet in June

The board of directors of the Chemical Institute of Canada have announced that the 1945 Canadian Chemical Conference will be held in Quebec City June 4, 5, 6.

Highlight of the conference will be a symposium on research to be held on June 6, the theme of which will be Coordination of Research and the National Welfare. Outstanding authorities from Great Britain, the United States and Canada will take part. They will discuss coordination of government, industrial and university research activity in Canada and other countries.

The Chemical Institute of Canada was officially formed January 1, 1945, by the amalgamation of the Canadian Chemical Association, Canadian Institute of Chemistry, and Society of Chemical Industry (Canada). L. E. Westman is president and A. E. G. Cadenhead is chairman of the council.

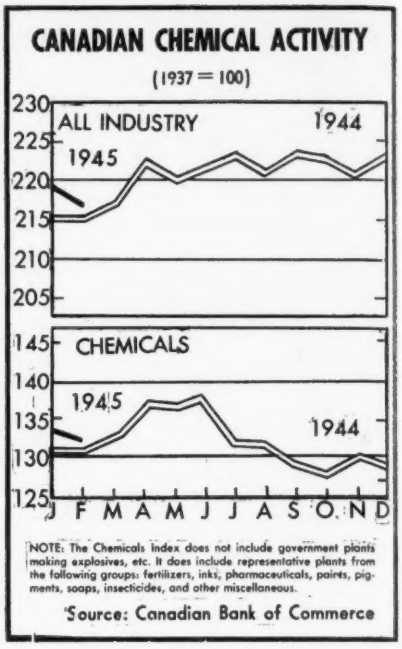
Monochloroacetic Acid and Chloral To Be Made

The research and development department of one of Canada's major organic chemical producers is concluding preliminary investigations on processes for the manufacture of monochloroacetic acid and chloral. It is reported as being probable that production of both these chemicals, never manufactured in the Dominion previously, will be realized within the year.

The Canadian market for chloral, which would be made in the Dominion by means of a novel acetaldehyde-based process, depends, of course, largely on the implementation of plans for the domestic manufacture of DDT. However, at press date, initial production of DDT in the very near future is definitely probable, and with the government vitally interested in the potentialities of the insecticide as a means of combating the forest-ravaging spruce bud worm, heavy tonnage demand for DDT is quite possible. Too, Canadian production costs of chloral, by the process mentioned, are regarded as favorable enough to permit the realization of a fair export market for the chemical.

Canadian consumption of monochloroacetic acid is, at present, small. But from a longer term view the part played by the acid as a raw material for the manufacture of the weedkiller, 2-4-dichlorophenoxyacetic acid, now coming into prominence (CI, Jan. '45, p. 78) is looked upon as offering interesting possibilities. Too, its employment in the production of carboxymethyl cellulose, another item of promise, enhances marketing prospects.

Neither the 2-4-D acid nor carboxymethyl cellulose is made in Canada at present, and it is improbable that either will be for some time to come, but basic Canadian costs of monochloroacetic are considered as competitive enough to permit the development of export sales of the acid.



Dominion Rubber Acquires Irwin Dyestuff

Dominion Rubber Co., Ltd., Canadian subsidiary of the U. S. Rubber Co., has recently purchased Irwin Dyestuff Corporation Ltd., according to President Paul C. Jones. Irwin Dyestuff, one of Canada's major dyestuff distributors, was created several years ago to take over the organization formerly owned by prewar Consolidated Dyestuff.

The Irwin Corporation will act as sales outlet for various dyes and chemicals, according to Mr. Jones, and will complement the activities of the Naugatuck Chemical division of Dominion Rubber.

The acquisition of the Irwin distributing facilities is a substantial addition to fast-growing, research-minded Naugatuck, which was established in Canada only four years ago. Originally, Naugatuck was set up to manufacture aniline. It has rapidly expanded into the rubber chemical field and into such aniline-based chemicals as acetanilide, quinoline, etc.

In view of the fact that no anline dyes are at present being manufactured in Canada, and that Naugatuck is Canada's prime aniline producer, chemical circles regard the purchase of the Irwin organization as more than incidentally significant.

New Hardesty Plant

W. C. Hardesty Co. of Canada Ltd., has brought in its recently constructed plant in New Toronto, and has begun splitting fats for fatty acids and glycerine. Plans call for increased output of oleic and stearic in the near future.

GUMS

(CRUDE, POWDERED)

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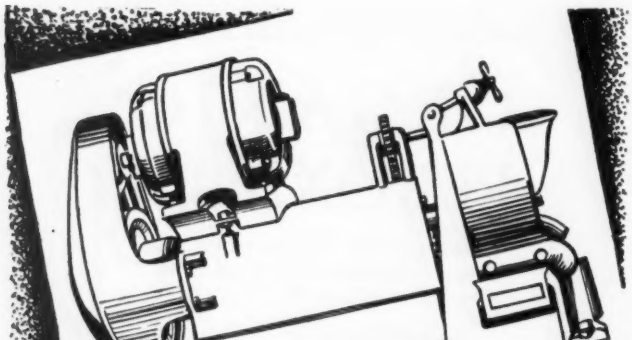

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Petroleum Reserves

More than two billion barrels of new petroleum reserves were added to the oil supply of the nation during 1944 by the discovery of new oil pools and the further development of older pools, according to the annual report of the API Committee on Petroleum Reserves, just made to the Board of Directors of the American Petroleum Institute.

Despite a record crude oil production of 1,678 million barrels during the year, the net gain in the proved oil reserves of the country amounted to 389 million barrels in 1944. During the year Alabama became the twenty-sixth oil producing state, while Louisiana and Mississippi led all other states in the reserves added by discovery. Texas, with reserves of 11,375 million barrels, has 55.6 percent of U. S. oil reserves, with California, Louisiana, Oklahoma, Kansas, Wyoming, and New Mexico following in the order named. In 1944 the new reserves resulting from discovery amounted to 511 million barrels, the highest figure since 1938, while additions to reserves by development added another 1,556 million barrels. Crude oil withdrawals from reserve amounted to 24.2 percent more than those of prewar 1941.

Report

The report of the American Petroleum Institute's Petroleum Reserves Committee, J. Edgar Pew, Chairman, follows:

The committee estimates that the proved reserves of crude oil in the United States, as of December 31, 1944, amounted to 20,453,231,000 barrels. This is derived as follows:

Total proved reserves as of December 31, 1943		20,064,152,000 bbl.
Extensions (new oil) and revisions during 1944	1,556,192,000 bbl.	
New reserves (new pools) discovered in 1944	511,308,000 bbl.	2,067,500,000 bbl.
Total proved reserves as of December 31, 1943 and new proved reserves added in 1944		22,131,652,000 bbl.
Subtract production during 1944		1,678,421,000 bbl.
Total proved reserves as of December 31, 1944		20,453,231,000 bbl.
Increase in Reserves since December 31, 1943		389,079,000 bbl.

The estimates in this report refer solely to proved or blocked-out reserves of crude oil (including condensate) known to be recoverable under existing economic and operating conditions.

Proved reserves are both drilled and undrilled. The proved drilled reserves, in any pool, include the oil estimated to be recoverable by the production systems now in operation (whether primary or secondary) and from the area actually drilled up on the spacing pattern in vogue in that pool. The proved undrilled reserves, in any pool, include reserves under undrilled spacing units which are so close, and so related, to the drilled units that there is every reasonable probability that they will produce when drilled.

In the case of new discoveries, which are seldom fully developed in the first year and in fact for several years thereafter, the estimates of proved reserves necessarily represent but a part of the reserves which may ultimately be assigned to the new reservoirs discovered each year. The total of new oil through discoveries estimated as proved in any given year is comparatively small and the total of new oil through extensions is comparatively large. As knowledge of the factors affecting production and well performance become available, and as these factors are studied, reserves in older fields can be estimated with greater precision and revised accordingly.

The committee again wishes especially to stress the fact that its estimates of proved reserves cannot be used as a measure of the rate at which these reserves can be produced with or without physical waste. Oil cannot be produced from the permeable rocks in which it occurs at any desired rate, because the flow of oil through the pores of the oil-bearing rocks is definitely controlled by physical factors of the reservoir. As a matter of fact, today's known oil can be recovered only over a period of many years and at gradually declining annual rates, as has been widely demonstrated by past performance under all kinds of operating conditions. For this reason, those, who through arbitrary division of the known reserves by any current rate of production or by any anticipated rate of consumption, try to estimate the life of proved reserves of oil, or the rate at which these reserves can be produced, arrive at an incorrect conclusion.

For comparative purposes we append a summary tabulation (Table II) of the

Table I

Estimated Proved Petroleum Reserves in the United States

(Thousands of Barrels of 42 U. S. Gallons)

	Proved Reserves as of December 31, 1943	*Changes in Proved Reserves due to Extensions (New Oil)* and Revisions during 1944*	*Proved Reserves in New Pools Discovered in 1944***	*Production During 1944 (Estimated)*	*Proved Reserves as of December 31, 1944*
Alabama	.....	.....	360	43	317
Arkansas	296,929	20,423	5,148	29,441	293,059
California	3,336,823	242,575	76,925	311,771	3,344,552
Colorado	45,111	46,025	647	2,960	88,823
Illinois	294,622	100,661	2,727	77,296	320,714
Indiana	31,039	3,887	1,657	5,090	31,493
Kansas	645,852	42,431	12,498	99,030	601,751
Kentucky	35,190	15,236	331	9,677	41,080
Louisiana	1,483,826	107,062	112,055	129,556	1,573,387
Michigan	55,248	17,745	10,700	18,559	65,134
Mississippi	38,872	6,973	179,533	16,367	209,011
Montana	108,057	11,829	346	8,582	111,650
Nebraska	1,000	.....	.....	419	581
New Mexico	653,981	−54,101	2,240	39,556	562,564
New York	90,525	.....	.....	4,694	85,831
Ohio	32,643	.....	1,925	2,944	31,624
Oklahoma	908,618	165,547	20,844	124,747	970,262
Pennsylvania	137,323	.....	.....	14,185	123,138
Texas	11,324,954	740,213	58,103	747,790	11,375,480
West Virginia	43,839	.....	.....	3,084	40,755
Wyoming	499,394	89,636	25,269	32,569	581,730
Miscellaneous***	306	50	.....	61	295
Total United States	20,064,152	1,556,192	511,308	1,678,421	20,453,231

* Extensions greatly exceed revisions.

** Only a limited area is assigned to each new discovery even though the committee may believe that eventually a much larger area will produce, for in this report we are concerned only with actually proved reserves.

*** Includes Florida, Missouri, Tennessee, Utah and Virginia.

Table II

Summary of Committee's Annual Reports Covering Period 1937-1944

(Thousands of Barrels of 42 U. S. Gallons)

Year	*New oil blocked out during year—Through Revisions of Previous Estimates and Extensions to Known Fields*	*Through New Pools Discovered During Year*	*Total Through New Discoveries, Extensions and Revisions*	*Production During Year*	*Estimated Proved Reserves as of End of Year*
1936	.....	.....	.....	.....	13,063,400
1937	2,792,790	928,742	3,721,532	1,277,664	15,507,268
1938	2,243,571	810,493	3,054,064	1,213,186	17,348,146
1939	2,058,455	340,667	2,399,122	1,264,256	18,483,012
1940	1,607,012	286,338	1,893,350	1,351,847	19,024,515
1941	1,538,989	429,974	1,968,963	1,404,182	19,589,296
1942	1,618,925	260,051	1,878,976	1,385,479	20,082,793
1943	1,202,368	282,418	1,484,786	1,503,427	20,064,152
1944	1,556,192	511,308	2,067,500	1,678,421	20,453,231

overall figures contained in the committee's annual reports covering the period from 1937 to 1944, inclusive. Figures for 1935 and 1936, which were the first developed by the committee, are not available separately.

Record Manganese Production

The production of manganese ore containing (natural) 35 per cent or more manganese in 1944 was the largest since 1918 and was the second most productive year on record, according to the Bureau of Mines, United States Department of the Interior. Output as measured by shipments from mines is estimated at 243,000 short tons during 1944, compared with 205,173 tons in 1943 and 190,748 tons in 1942. The major contributors during 1944 were the Anaconda Copper Mining Co., Anaconda, Montana, the Domestic Manganese and Development Co., Butte, Montana, the Dominion Manganese Corp., Waynesboro, Virginia, and the Manganese Ore Co., Las Vegas, Nevada.

Shipments of ore containing from 5 to 35 per cent manganese in 1944 totaled

Chemicals: United States Production, Consumption, and Stocks, January 1945

Chemical and Basis	Unit	January (Preliminary) Production	January (Preliminary) Consumption in producing plants	January (Preliminary) Stocks at producing plants, end of month	December (Revised) Production	December (Revised) Consumption in producing plants	December (Revised) Stocks at producing plants, end of month
Acetylene:							
For use in chemical synthesis	M cu. ft.	(1)			319,079		
For commercial purposes	M cu. ft.	(1)	(1)	(1)	131,912		
Aluminum chloride:							
Anhydrous and crystal (100% $AlCl_3$)	M pounds	5,140	(2)	3,428	4,630	(2)	3,262
Solution (32° Be')	M pounds	1,034	....	503	1,113	....	483
Aluminum sulfate:							
Commercial (100% $Al_2(SO_4)_3$)	M pounds	(3)	(3)	(3)	(3)	(3)	(3)
Iron free (100% $Al_2(SO_4)_3$)	M pounds	(3)	(3)	(3)	(3)	(3)	(3)
Synthetic anhydrous ammonia (100% NH_3)[4]	Short tons	49,863	35,290	7,409	50,833	32,026	6,120
Ammonium chloride (100% NH_4Cl)	M pounds	5,075	....	2,659	5,263	....	2,182
Barium sulfate (Blanc fixe') (100% Ba SO_4)	M pounds	5,042	3,827	3,953	5,450	4,109	3,947
Bleaching powder (35-37% Available Cl$_2$)	M pounds	1,950	....	389	2,466	....	993
Calcium acetate (80% Ca $(C_2H_3O_2)_2$)	M pounds	785	....	312	957	....	253
Calcium arsenate (100% $Ca_3(AsO_4)_2$)	M pounds	1,766	(2)	15,921	1,393	(2)	15,295
Calcium carbide (Commercial)	Short tons	(1)	(5)	(1)	63,713	(5)	30,382
Calcium hypochlorite (true) (70% Available Cl$_2$)	M pounds	1,317	(2)	1,189	1,214	(2)	784
Calcium phosphate:							
Monobasic (100% $CaH_4(PO_4)_2$)	M pounds	4,716	(2)	4,398	4,461	(2)	5,195
Dibasic (100% $CaHPO_4$)	M pounds	3,519	(2)	2,780	4,248	(2)	2,699
Carbon, activated	M pounds	5,069	(2)	4,753	4,970	(2)	4,828
Carbon black (Channel):							
Rubber grade	M pounds	35,667	....	24,396	34,041	....	*37,990

Cellulose Plastic Products: Production, and Shipments and Consumption, in the United States, by Months, 1942-1944

Presented here are statistics on cellulose plastic products, publication of which was discontinued in June 1942. Distribution of these data was restricted subsequent to June 1942 for reasons of national security, and while these restrictions have been relaxed, it is deemed necessary to withhold data for recent months.

Data are based on the reports of 15 manufacturers which represent practically the entire industry. Nine manufacturers make cellulose nitrate products, six make cellulose acetate products and ten make cellulose acetate molding composition. Beginning October 1943, data are included for two companies which produce cellulose acetate molding composition from scrap material. While these companies were in operation prior to October 1943, comparability of the data is little affected; in that month, they made no shipments and accounted for only 2 percent of total molding composition production. One additional company reported cellulose acetate sheets, rods and tubes for the first time in November 1943. The production of this company is so small that comparability is unaffected.

The production, and shipments and consumption figures represent data reported by prime manufacturers of cellulose plastic materials and include no data for plastic molding companies which manufacture products from purchased material. This results in some understatement of the data for cellulose acetate sheets, rods and tubes. Manufacture of these products from purchased material, however, is reflected in the data here shown for shipments of cellulose acetate molding composition. The statistics shown for sheet forms do not contain data for safety glass sheeting. They may, however, contain data for some wrapping material, since the report form does not specify that such should be excluded.

(In pounds)

Year and Month	Nitrocellulose: Total Production	Nitrocellulose: Total Shipments and consumption	Nitrocellulose: Sheets Production	Nitrocellulose: Sheets Shipments and consumption	Nitrocellulose: Rods Production	Nitrocellulose: Rods Shipments and consumption	Nitrocellulose: Tubes Production	Nitrocellulose: Tubes Shipments and consumption	Cellulose Acetate: Sheets, rods, and tubes Production	Cellulose Acetate: Sheets, rods, and tubes Shipments and consumption	Cellulose Acetate: Molding composition Production	Cellulose Acetate: Molding composition Shipments
1942												
Total	15,128,826	16,038,188	10,422,370	10,838,323	3,662,075	3,819,016	1,044,381	1,380,849	7,453,307	6,777,324	40,792,518	38,794,514
January	1,617,597	1,754,858	1,113,319	1,191,391	362,840	408,070	141,438	155,397	585,319	541,536	3,788,786	3,597,003
February	1,376,603	1,545,087	922,605	1,050,319	319,840	350,342	134,158	144,426	566,575	504,428	3,477,850	3,224,519
March	1,434,262	1,393,563	1,006,242	984,379	296,100	269,593	131,920	139,591	519,357	486,470	3,643,633	3,444,374
April	1,414,867	1,526,497	983,607	1,017,634	321,667	337,315	109,593	171,548	567,799	588,458	3,606,741	3,460,615
May	1,295,696	1,304,725	898,034	842,003	340,205	325,579	57,457	137,143	465,100	482,676	3,178,564	3,053,767
June	1,374,476	1,364,151	946,198	900,336	364,652	342,653	63,626	121,162	556,579	523,011	3,241,441	3,048,020
July	1,292,700	1,386,918	859,985	951,402	381,369	333,544	51,346	101,972	680,261	586,089	3,571,206	3,512,711
August	1,097,770	1,176,162	733,280	762,313	301,869	323,972	62,621	89,877	644,264	569,004	3,120,623	2,964,037
September	988,895	1,115,982	614,915	754,911	296,722	276,242	77,258	84,829	736,508	576,392	3,123,755	2,965,509
October	1,171,127	1,181,774	788,423	762,339	256,865	345,095	125,839	74,340	808,220	669,495	2,854,911	2,652,899
November	999,017	1,114,302	760,690	758,947	190,686	278,809	47,641	76,546	602,925	563,082	3,297,436	2,966,399
December	1,065,816	1,174,169	795,072	862,349	229,260	227,802	41,484	84,018	720,400	686,683	3,887,572	3,904,661
1943												
Total	14,042,348	14,530,299	8,929,257	9,323,639	4,280,853	4,409,707	832,238	796,953	10,163,467	10,082,236	44,222,714	42,214,571
January	798,682	1,362,711	567,470	938,260	194,156	351,622	37,056	72,829	870,247	862,522	3,429,318	3,259,862
February	1,064,329	1,037,279	690,727	696,234	305,306	275,087	68,296	65,958	767,777	787,955	3,129,928	3,014,786
March	1,349,511	1,360,872	843,331	872,723	420,422	412,775	85,758	75,374	989,501	894,642	3,960,309	3,781,930
April	1,098,108	1,158,575	728,959	762,746	298,676	329,671	70,473	66,158	835,664	787,221	2,797,914	2,784,156
May	1,059,867	1,184,164	657,691	769,003	326,896	340,684	75,280	74,477	777,105	865,359	3,112,343	2,981,041
June	1,130,427	1,288,192	695,331	802,304	360,395	392,458	74,701	93,430	1,008,936	1,033,179	3,457,071	3,323,974
July	1,226,851	1,171,263	691,217	704,466	452,946	399,429	82,688	67,368	906,526	881,402	3,821,202	3,610,795
August	1,303,006	1,259,883	827,458	797,837	417,629	406,187	57,919	55,859	822,979	873,478	4,101,073	3,924,581
September	1,158,733	927,709	764,390	511,960	335,362	362,948	58,981	52,801	858,029	725,602	3,953,374	3,753,754
October	1,343,103	1,268,816	845,555	822,426	429,656	391,254	67,892	55,136	781,255	718,903	3,875,817	3,651,970
November	1,326,970	1,248,411	870,315	841,268	381,712	361,925	74,943	45,218	755,475	772,029	4,350,618	3,942,452
December	1,182,761	1,262,424	746,813	804,412	357,697	385,667	78,251	72,345	789,973	879,944	4,233,747	4,185,270
1944												
January	1,275,119	1,209,993	791,671	770,263	409,823	377,964	73,625	61,766	798,925	838,260	4,040,660	3,705,769
February	1,443,101	1,318,505	920,565	793,903	450,050	472,650	72,486	51,952	721,952	868,261	4,213,788	4,019,165
March	1,468,320	1,479,146	931,996	917,165	459,720	480,003	76,604	81,978	646,137	822,248	4,482,339	3,878,183
April	1,474,637	1,511,507	947,496	951,989	431,395	467,117	95,746	92,401	676,416	622,199	4,878,333	4,544,239
May	1,456,855	1,469,530	882,587	897,395	484,628	483,626	89,640	88,509	762,307	842,301	5,204,868	4,672,882
June	1,468,681	1,561,850	907,405	943,928	448,191	505,433	113,085	112,489	704,136	757,546	4,860,128	4,528,425
July	1,198,118	1,291,518	726,664	774,303	381,927	419,223	89,527	97,992	736,111	675,785	4,517,606	4,207,545
August	1,382,746	1,319,348	894,642	820,133	396,356	410,655	91,748	88,560	730,922	731,818	5,007,831	4,504,670

Chemicals: United States Production, Consumption, and Stocks; January 1945 (cont'd)

Other than rubber grade	M pounds	2,462	....	16,136	3,144	....	*16,293
Carbon dioxide:							
Liquid and gas	M pounds	(1)	(1)	(1)	*15,966	2,784	*2,962
Solid (dry ice)	M pounds	(1)	....	(1)	42,781	....	5,978
Chlorine	Short tons	103,953	61,794	8,127	*107,065	61,061	6,506
Chrome green (C. P.)	M pounds	646	82	1,200	648	75	1,271
Chrome yellow and orange (C. P.)	M pounds	3,356	348	1,856	3,148	342	2,396
Copper acetoarsenite (Paris green)	M pounds	(1)	(2)	(1)	418	(2)	748
Hydrochloric acid (100% HCl)	Short tons	35,008	23,235	2,981	*34,346	19,957	*3,751
Hydrogen	Millions of cubic feet	(1)	(1)	(5)	2,086	1,751	(5)
Hydrogen peroxide (100 volumes)	M pounds	2,636	99	1,604	2,661	45	*1,170
Lamp black	M pounds	1,121	(2)	1,377	1,210	(2)	1,377
Lead arsenate (acid and basic)	M pounds	(1)	(1)	(1)	7,962	129	14,808
Lead oxide:							
Red (C. P.)	M pounds	7,911	177	3,708	7,936	423	3,716
Yellow (C. P.)	M pounds	29,647	7,076	9,473	32,186	6,310	*8,989
Methanol:							
Natural (80% CH_3OH)	M gallons	317	(5)	278	*350	(5)	*272
Synthetic (100% CH_3OH)	M gallons	6,455	(2)	3,166	5,851	(2)	2,382
Molybdate chrome orange (C. P.)	M pounds	137	2	135	105	2	154
Nitric acid (100% HNO_3)	Short tons	40,740	36,581	6,966	41,328	36,119	7,380
Nitrous oxide	M gallons S.T.P.	(1)	....	(1)	9,440	....	3,642
Oxygen	M cu. ft.	(1)	(1)	(2)	1,496,821	34,482	(2)
Phosphoric acid (50% H_3PO_4)	Short tons	51,218	45,118	13,374	*58,237	*50,872	*12,973
Potassium bichromate and chromate (100%)	M pounds	596	....	519	489	....	496
Potassium hydroxide (caustic potash) (100% KOH)	Short tons	4,124	812	1,463	4,048	921	1,295
Soda ash (Commercial sodium carbonate):							
Ammonia soda process—							
Total wet and dry (98-100% Na_2CO_3)[6]	Short tons	365,718	....	....	368,588	....	....
Finished light (98-100% Na_2CO_3)	Short tons	185,516	52,829	41,465	197,315	60,389	33,923
Finished dense (98-100% Na_2CO_3)	Short tons	124,948	2,785	35,193	124,019	3,004	24,238
Natural	Short tons	(3)	(2)	(3)	16,032	(2)	3,666
Sodium bicarbonate (refined) (100% $NaHCO_3$)	Short tons	12,614	(2)	5,672	13,274	(2)	5,077
Sodium bichromate and chromate (100%)	Short tons	6,582	(2)	823	6,854	(2)	710
Sodium bisulfite (100% $NaHSO_3$)	M pounds	2,947	(2)	995	3,390	(2)	892
Sodium hydrosulfide (100% NaSH)	M pounds	1,710	(2)	656	1,620	(2)	973
Sodium hydrosulfite (100% $Na_2S_2O_4$)	M pounds	3,121	(2)	1,393	3,023	(2)	1,817
Sodium hydroxide (caustic soda):							
Electrolytic process—							
Liquid (100% NaOH)	Short tons	101,993			103,708		
Solid (100% NaOH)	Short tons	19,461			18,643		
Lime-soda process—			36,233	64,204		34,189	*63,932
Liquid (100% NaOH)	Short tons	63,260			62,354		
Solid (100% NaOH)	Short tons	19,860			19,506		
Sodium phosphate:							
Monobasic (100% NaH_2PO_4)	Short tons	(1)	(2)	(1)	*1,141	(2)	*208
Dibasic (100% Na_2HPO_4)	Short tons	(1)	(2)	(1)	3,951	(2)	648
Tribasic (100% Na_3PO_4)	Short tons	(1)	(1)	(1)	6,584	180	1,831
Meta (100% $NaPO_3$)	Short tons	(1)	(2)	(1)	1,834	(2)	453
Tetra (100% $Na_4P_2O_7$)	Short tons	(1)	(1)	(1)	2,645	110	351
Sodium silicate:							
Soluble silicate glass, liquid and solid (anhydrous)	Short tons	38,397	(5)	46,811	40,901	(5)	50,677
Sodium sulfate:							
Anhydrous (refined) (100% Na_2SO_4)	Short tons	(1)	(2)	(1)	5,576	(2)	2,318
Glauber's salt (100% $Na_2SO_4.10H_2O$)	Short tons	(1)	(2)	(1)	16,611	(2)	3,203
Salt cake (crude) (commercial)	Short tons	(1)	(2)	(1)	50,879	(2)	84,080
Sulfur dioxide	M pounds	(1)	(1)	(1)	*6,142	*3,217	2,921
Sulfuric acid:							
Total (100% H_2SO_4)	Short tons	854,406	....	....	853,254	....	....
Chamber process (100% H_2SO_4)	Short tons	296,416	....	262,681	293,503	....	253,479
Contact process (100% H_2SO_4)	Short tons	557,990			559,751		
Net contact process (100% H_2SO_4)	Short tons	477,800	....	....	483,328	....	....
White lead:							
Basic lead carbonate (C. P.)	Short tons	5,105	1,674	3,815	*6,832	2,741	3,608
Basic lead sulfate (C. P.)	Short tons	1,004	....	187	838	....	133
Zinc yellow (zinc chromate) (C. P.)	Short tons	1,492	(2)	484	1,268	(2)	596

[1] Data by months are collected on a quarterly report form and are presented in releases in this "Facts for Industry" series covering the months of March, June, September and December.
[2] Data cannot be published without disclosing operations of individual establishments.
[3] Not yet available.
[4] A small amount of aqua ammonia is included in the figures reported by one company.
[5] Not available; see "Facts for Industry," Series 6-1-1.
[6] Total wet and dry production, including quantities diverted for manufacture of caustic soda and sodium bicarbonate, and quantities processed to finished light and finished dense soda ash. For detailed discussion of soda ash statistics, see "Facts for Industry," Series 6-1-1.
[7] Not including quantities converted to finished dense soda ash.
* Revised.

1,660,000 short tons. Much of this ore came from the Cuyuna range in the Lake Superior district, and the bulk contained less than 10 per cent (natural) manganese. Shipments from mines of ferruginous manganese ore containing 10 to 35 per cent manganese in 1942 and 1943 amounted to 268,764 tons and 471,593 tons respectively, and shipments of manganiferous iron ore (5 to 10 per cent Mn) totaled 1,500,613 tons and 1,251,275 tons respectively.

Production of ferromanganese during 1944 is estimated at 704,000 short tons, compared with 661,338 tons in 1942 and 702,484 tons in 1943. Spiegeleisen production is estimated at 170,000 tons in 1944. In 1942 and 1943 production amounted to 186,026 tons and 149,036 tons respectively.

The War Production Board ordered the shutdown of the Government-owned manganese leaching and nodulizing plant of the Manganese Ore Company at Las Vegas, Nevada, as a result of the Nation's ability to maintain adequate supplies of manganese ore from established sources, thereby eliminating the need of continuing this relatively high cost operation.

Soap Consumption

More than 5,000,000,000 lbs. of detergents were sold last year, of which quantity over 3,000,000,000 lbs. was soap, and the remainder was comprised of special industrial detergents, according to Dr. Foster D. Snell in a recent speech before the Detroit section of the American Chemical Society.

Zinc Production Declines in 1944

For the first year since 1940, smelter production of slab zinc in 1944 showed a decline, according to the Bureau of Mines, United States Department of the Interior. Production from both domestic and foreign ores was lower, but output of redistilled secondary slab zinc remained virtually unchanged. The dominant factor causing the decline was the acute shortage of manpower at mines and smelters. Despite the downward trend in smelter output the total produced, plus net imports, exceeded the increased consumption of slab zinc with the result that total stocks in the hands of producers (including Government-owned metal) and consumers showed a steady gain throughout 11 months of 1944. The ceiling price of 8.25 cents a pound, East St. Louis, remained unchanged throughout the year, and payments under the premium-price plan continued to be made by the Metals Reserve Company.

Production.—Total domestic production of slab zinc including primary metal from domestic and foreign ores and redistilled secondary from scrap (based on producers'

Synthetic Organic Chemicals: United States Production, Consumption, and Stocks, November, December, and Total, 1944

(In pounds, except that creosote oil is expressed in gallons.)

Item	November	December	Total 1944
Acetanilide (technical and U. S. P.):			
Production	[4]	[4]	4,670,813
Consumption	45,388	46,961	1,831,086
Stocks	305,133	373,698	373,698
Acetic acid (synthetic):[1]			
Production	26,451,893	24,701,553	291,953,913
Consumption	17,863,173	19,724,525	208,669,173
Stocks	9,808,324	7,626,408	7,626,408
Acetic acid (natural, including that from calcium acetate):[2]			
Production	3,546,799	3,239,071	40,489,764
Consumption	[4]	[4]	[4]
Stocks	1,427,012	1,486,345	1,486,345
Acetic anhydride:[3]			
Production	42,326,551	43,899,666	493,654,125
Consumption	32,058,881	33,119,775	378,547,281
Stocks	12,379,571	12,108,161	12,108,161
Acetylsalicylic acid (Aspirin):			
Production	774,291	845,689	9,256,636
Consumption	[4]	[4]	[4]
Stocks	910,071	980,264	980,264
n-Butyl acetate:			
Production	5,401,955	5,533,989	69,758,996
Consumption	[4]	[4]	[4]
Stocks	3,190,524	3,044,207	3,044,207
Creosote oil, tar distillers:[5]			
Production	10,262,031	10,813,362	121,149,971
Consumption	638,390	650,310	9,785,877
Stocks	10,393,778	9,943,840	9,943,840
Creosote oil, byproduct:[6]			
Production	3,222,103	3,420,784	41,425,558
Consumption	19,926	21,139	652,051
Stocks	536,749	767,701	767,701
Cresols, meta-para:[7]			
Production	582,474	735,683	7,072,828
Consumption	[4]	[4]	1,178,183
Stocks	338,630	412,678	412,678
Cresols, ortho-meta-para:[7]			
Production	729,180	654,067	9,910,680
Consumption	.....	.....	[4]
Stocks	[4]	163,869	163,869
Cresylic acid, crude:			
Production	2,259,341	2,375,196	25,726,115
Consumption	[4]	[4]	[4]
Stocks	736,186	890,484	890,484
Cresylic acid, refined:[7]			
Production	3,279,265	3,076,886	40,725,366
Consumption	[4]	[4]	[4]
Stocks	1,904,653	1,694,161	1,694,161
Diethyl ether (all grades):			
Production	6,952,897	6,873,034	69,756,693
Consumption	[4]	[4]	[4]
Stocks	4,479,340	4,505,445	4,505,445
Ethyl acetate (85 percent):			
Production	10,266,097	9,851,538	108,181,447
Consumption	1,041,706	1,268,375	16,213,793
Stocks	4,872,993	6,240,742	6,240,742
Lactic acid (edible):			
Production	253,222	317,476	[4]
Consumption	[4]	[4]	[4]
Stocks	241,162	168,445	168,445
Lactic acid (technical):			
Production	615,170	682,786	4,217,062
Consumption	9,955	20,910	195,018
Stocks	243,012	291,339	291,339
Methyl chloride (all grades):			
Production	2,499,243	2,316,554	24,635,938
Consumption	[4]	[4]	[4]
Stocks	423,711	426,121	426,121
Naphthalene, less than 79° C. (coke-oven operators):			
Production	8,427,345	8,032,656	102,638,980
Consumption	.....	.....	.....
Stocks	1,966,740	2,060,215	2,060,215
Naphthalene, less than 79– C. (tar distillers):			
Production	19,473,424	18,005,189	203,085,250
Consumption	[4]	[4]	[4]
Stocks	7,693,999	7,251,964	7,251,964
Naphthalene, refined (79° C. and over):			
Production	6,394,297	6,216,754	82,138,629
Consumption	4,940,888	4,666,550	55,623,912
Stocks	2,534,520	2,091,252	2,091,252
Oxalic acid (technical):			
Production	1,550,344	1,625,357	17,981,554
Consumption	[4]	[4]	[4]
Stocks	349,778	311,210	311,210
Phenobarbital and sodium salts:			
Production	22,463	13,776	234,074
Consumption	10,263	[4]	93,940
Stocks	45,045	41,924	41,924
Phthalic anhydride:			
Production	10,425,671	10,778,529	124,063,494
Consumption	4,020,089	3,969,338	38,994,787
Stocks	2,835,145	1,749,103	1,749,103
Riboflavin (for human use):			
Production	[4]	[4]	[4]
Consumption	[4]	985	[4]
Stocks	34,211	35,081	35,081
Sulfa drugs (total):			
Production	319,527	359,925	4,597,050
Consumption	25,461	[4]	909,871
Stocks	834,100	796,192	796,192

[1] Excludes statistics on recovered acetic acid, which are confidential.

[2] Natural acetic acid (produced by direct process from wood) and acetic acid distilled from calcium acetate. These statistics are collected and compiled by the U. S. Bureau of the Census.

[3] Represents all acetic anhydride, including that produced from acetic acid by the vapor-phase process.

[4] Confidential; publication would disclose operations of individual companies.

[5] Product of distillers who use purchased coal tar only.

[6] Product of byproduct coke-oven operators only. These statistics are collected and compiled by the Coal Economics Division, U. S. Bureau of Mines.

[7] Statistics represent total production, consumption, and stocks, including both data reported by coke-oven operators to the Coal Economics Division, Bureau of Mines, and data reported by distillers of purchased coal tar to the U. S. Tariff Commission. Data reported to the two agencies are combined to prevent the disclosure of the operations of individual companies.

monthly reports for twelve months) decreased 8 per cent from the record established in 1943. The preliminary figure of 914,700 short tons represents the total output after making adjustments for refining lower grades of zinc into regular and special high grade with resultant metallurgical losses.

Stocks.—Inventories of slab zinc at producers' plants continued to rise in 1944, and at the end of the year—following a moderate drop in December—were 36 per cent above beginning stocks and 16 times the low total of 19,973 tons on hand at the end of 1940. The gain in 1944 was entirely at primary smelters (stocks at secondary plants having declined markedly) and the greater part of the stocks on hand December 31 were owned by the Metals Reserve Company.

Some measure of the drop can be attributed to the unwillingness on the part of the consumer to maintain or build up stocks in the face of economic uncertainties which may accompany V-E Day, particularly the question of prices. Yet another factor was the cut-back in the brass manufacturing program later in the year prior to the resumption of production. This is evidenced by the greatest decreases which were shown in the special and regular high grade classifications and in the brass products group which is the largest consumer of these grades of zinc.

In addition to physical stocks on hand at consumers' plants at the end of 1944, an estimated total of 14,000 tons of zinc was in transit to consumers, held for redistillation, and in dealers' hands. The approximate total slab zinc in stock (including inventories at producers' plants, but excluding Metals Reserve Company stocks held at points other than smelters) amounted to 292,000 tons, a 7 per cent gain over the comparative figure of 273,000 tons at the end of 1943.

Consumption.—Apparent deliveries of slab zinc (primary and redistilled secondary) to domestic consumers in 1944 amounted to about 941,600 tons. This was 10 per cent higher than the previous record total of 854,574 tons calculated for 1943, and thereby established a new high level. Actual consumption at 475 plants during 11 months in 1944 (approximately 794,000 tons) plus an estimate for December gives a figure of 868,000 tons which includes 8,000 tons of remelt zinc. Adjustments upward on the basis of the survey coverage being an estimated 92 per cent indicate that final figures will be in reasonably close agreement. It is of interest to note the shift in industrial consumption of slab zinc in 1944 between the two major use categories, galvanizing and brass products. In January galvanizing accounted for 33 per cent and brass products 47 per cent of the total consumed, and by November the percentages were 40 and 36, respectively.

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MARKET INTERPRETATION AND REVIEW

Rubber Needs Rise

Coal Strike Threatens Chemical Production

Crude Oil Moved to Coast For Refining

Insecticides Supply Will Fall Short of Demands

Report Boosts Fertilizers

Magnesium Production Cut

Lack of Manpower Besets Naval Stores

Review of Chemical Commodities

●

More Rubber Needed

A sharp increase in the 1945-46 program for the production of synthetic rubber will be necessary to meet military and essential civilian transportation demands.

Production tonnage in 1944 was 763,255 long tons—exceeding the average annual tonnage of natural rubber used in 1937-41—and one million tons are scheduled for 1945. The goal for 1946 is still higher: 1,200,000 tons—larger than world consumption in any prewar year.

To meet these goals production will have to be increased to 145 per cent of the present rated capacity. This does not mean, however, that a 45 per cent increase in facilities is necessary; continued research and development, and experience in the operation of existing plants make above-capacity operations possible.

The Rubber Reserve Company has pointed out the conditions which must be met in order that the above goals might be reached: (1) adequate supplies of petroleum, alcohol, and chemicals must be made available; (2) three per cent of the original cost of plants must be expended for additions and improvements; and (3) enough technically trained men must be retained.

Our natural rubber stockpile has fallen to 93,000 tons, and current plans are that 85 per cent of 1945 consumption—estimated at 900,000 tons—will be of synthetic material. The latter material is used up to 100 per cent in many war items, including fuel tanks, pontoons, boots, clothing, tubing, diaphragms, and hose of all kinds. Only one type of military tire is made completely of natural rubber, and the overall tire average is 86 per cent synthetic.

A spokesman for the Netherlands rubber interests predicted that the Netherlands East Indies would be able to export rubber 90 days after liberation. A new government-controlled organization will be formed to control the production and trade of rubber. Known as the *Rubber Centrale*, the new group will be managed by a board representing the several rubber industries and associations.

Before the war the Indies produced 45 per cent of the world's rubber.

Production Threatened by Diminishing Coal Stocks

Consumption of bituminous coal in January, aggrandized by increased industrial activity and continued cold weather, set an all-time monthly record, requiring heavy withdrawals from stockpiles and cutting the protection of industrial users to a 26-days' supply on February 1.

Coal supplies have been dwindling since the middle of 1944; consequently, the Solid Fuels Administration asked the War Production Board to prepare a list of those who will receive prior deliveries when their stocks reach a dangerously low point. It will be applied only if local or national shortages assume serious proportions.

The list is by classes as follows:

Class 1: Minimum requirements to all plants to prevent irreparable damage to equipment resulting from a coal shortage.

Class 2: Bunker fuel for ships, railroads, and public utilities.

Class 3: Minimum requirements for hospitals, central steam plants, households, hotels, and other living quarters.

Class 4: Critical plants and services.

Class 5: Manufacture or conduct of business not mentioned above, rated AA1 for maintenance, repair, and operating supplies. Also, minimum requirements for office buildings, restaurants, passenger stations, and plants requiring only space heating.

Class 6: Establishments rated AA2, except schools and other public buildings not essential to war effort.

Class 7: Those not covered in classes 1 through 6.

In the event that the threatened coal strike materializes this spring, the above list will determine the distribution of available supplies in such a manner that war production will suffer to the least possible extent.

Texas Crude Refined on Coast

The urgent necessity for petroleum products has made it necessary to ship Texas crude oil to California refineries at an ever-increasing rate. Efforts are being made to expand the movement from 14,500 to 42,000 bbls. per day.

All of the pools and fields on the Coast are being utilized at their maximum efficient rates or greater. While this is necessary as an emergency measure, such overproduction should not be continued.

"It has been suggested that the drilling of more wells be permitted. That would be most acceptable if manpower and materials were available, if sufficient undeveloped reserves existed, and if time permitted," commented Deputy Petroleum Administrator Ralph K. Davies.

The 30-degree crude is delivered in California by the Defense Supplies Corporation at a total cost of about $3.35 per barrel. It is sold to the refineries at $1.073 per barrel, DSC absorbing the difference.

Large Insecticide Demand Expected

Shortages of labor and containers will prevent insecticide production from expanding to meet expected demands this summer. Both foreign and domestic needs will be higher, but essential requirements will be met, manufacturers believe. Lend-Lease buying will be heavy, particularly in cyanides for the protection of recently liberated citrus-growing areas.

Last year farmers spent $100,000,000 to protect $4,600,000,000 worth of crops from a total crop valued at $12,800,000,000. Plant damage from insects and diseases is estimated at $3,000,000,000 annually by the Bureau of Entymology and Plant Quarantine.

The supply of raw materials is spotty: Available in adequate supply are calcium arsenate, sulfur, and cryolite. Limited supplies of pyrethrum, rotenone, nicotine, lead arsenate, and copper chemicals—with the exception of copper sulfate, which is in adequate production—will be available for agricultural purposes.

Government Policy to Increase Fertilizer Use

A report entitled "A National Policy for Fertilizers and Liming Materials" has been prepared by representatives of the Department of Agriculture and the War Food Administration.

After commenting on the importance of adequate and proper use of fertilizers, the report states that the Department of Agriculture, because of its experience, its contact with farmers and farm or-

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ganizations, agricultural colleges, and industry, and its effective widespread organization, should be responsible for formulation of policy and programs.

The two-fold use of fertilizers for balanced agricultural production and maintenance of soil resources is contemplated; and a summary is given of the amounts of fertilizers farmers could profitably use for the accomplishment of these purposes: 1,100,000 tons of nitrogen (N); 2,700,000 tons of phosphoric acid (P_2O_5); and 1,700,000 tons of potash (K_2O). The aggregate of these amounts represents a little less than 400 per cent of the 1935-39 average, and a little over 200 per cent of the 1944 total.

Recommendations for achieving these objectives were given: (1) use of high-analysis fertilizers; (2) substantial increase in Federal aid program; (3) research on uses of fertilizers and pilot-plant development of new products and processes; (4) reduction of such cost elements as rail, barge, and ship rates; (5) conversion of Government-owned nitrogen plants with a rated capacity of 300,000 tons N for production of nitrogenous fertilizers and ammonium derivatives, and duty-free importation of those materials for fertilizer use; (6) Government support of phosphate plants by commitments to purchase a portion of the output until profitable operation is established, by loans, and by outright construction; and (7) intensified exploration for potash on public lands, and importation of potash to conserve domestic supplies.

Adoption of these recommendations by the Government and by agricultural groups will exert a telling influence on our chemical production in future years.

Magnesium Output 15 Per Cent of Capacity

Ten plants, with 85 per cent of the total magnesium-producing capacity of 600,000,000 lbs. per year, have been shut down. The present stockpile of the metal is 100,000,000 lbs.

Dr. Willard H. Dow, president of the Dow Chemical Co., estimated that post-war demands would use a tenth of our present productive capacity. The future of magnesium is tied up with the older metals. Heavy wartime consumption of these may force a shift to lower grade and therefore more expensive ores, putting magnesium in a stronger competitive position.

Outlook Unfavorable for Gum Naval Stores

A spokesman for the gum naval stores industry foresees a 10 to 15 per cent drop in production for the 1945-46 season, commenting that the situation is the worst since World War I, when the industry closed down.

The obvious and primary cause is, of course, the lack of labor. This appears to be irremediable, since workers have been called into the service or drawn into higher-paying war industries.

The methods of production do not lend themselves to mechanization, and the industry therefore depends, and will have to depend, on hand labor. This spokesman foresees no increase in production until there is a deflation whereby industries are forced to cut their wage scale to that which the naval stores industry can meet, or until ceiling prices for gum turpentine and rosin are raised so that producers can match higher wage scales.

Heavy Chemicals

The movement of heavy chemicals has been hampered by transportation difficulties. Metal stockpiles—copper, lead and zinc—have been dwindling. Supplies of the first two were down to 285,000 and 65,000 tons respectively at the end of March. Tin stocks, too, are dangerously low, and the price of Bolivian tin has been increased in order to encourage production.

An anticipated shortage of carbon dioxide has prompted the War Production Board to look into the advisability of allocating it soon. Soda ash and caustic may also be put under unofficial controls.

The prospect of a freon "holiday" to make material available for civilian refrigeration requirements has been dimmed by new Army demands for the chemical.

Fine Chemicals

A reduction in the price of isophorone was announced by Carbide & Carbon Chemicals Corp. This ketone is widely employed at a solvent for vinyl resins.

A large manufacturer of DDT predicted that supplies of the insecticide material will exceed military demands by May or June and be released to civilian trade channels.

The need for methanol in formaldehyde manufacture, and the diversion of production facilities to ammonia, preclude its use for anti-freeze purposes next winter.

War needs have increased the estimated requirements for ethyl alcohol in 1945. The current estimate is 649,000,000 gallons, compared with 606,000,000 in 1944. Stocks late in February were 69,000,000 gallons, and these are expected to drop to 28,000,000 by the end of 1945. About half of the butadiene required for GR-S rubber will have to be made from alcohol, WPB estimates.

Other important developments in fine chemicals lately were a reduction in butyl alcohol prices, an increase in the price of sulfanilamide, and release by the Government of 250 tons of iodine.

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Chemical formula.....CH_3Cl
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Odor.....Ethereal, non-irritating
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Boiling point .... −10.65° F. (−23.7° C.)
Critical temperature..289.6° F. (143.1° C.)
Critical pressure..969.2 lbs. per sq. in. abs.
Solubility.....Methyl chloride in water—3 to 4 volumes methyl chloride vapor in 1 volume of water at ordinary temperatures and atmospheric pressure—methyl chloride in alcohol—readily soluble
Density of liquid at 80° F. (56.714 lbs. per cu. ft.)
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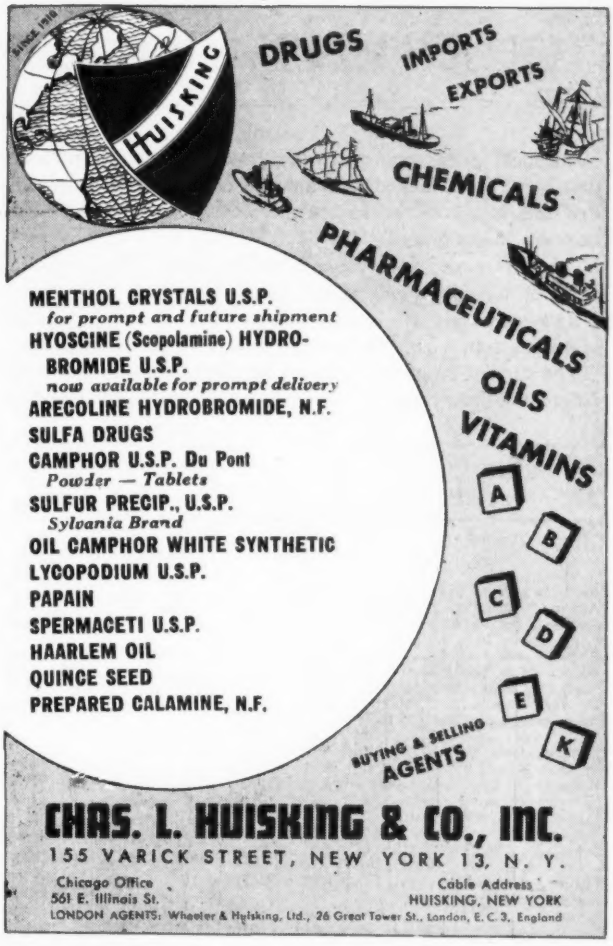

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TYPICAL ANALYSIS:
Clear colorless to very pale yellowish somewhat viscous liquid.
Assay for nikethamide 99.3%
pH of 25% solution 6.4 — Melting Point 24.5-26° C
Boiling Point 128-129°C/3mm
Refractive Index at 25° C — 1.5234
Free from acids, chlorides, nitrates, nicotinic acid and foreign impurities.

Specify Lemke Nikethamide to be assured of a product of highest quality and uniformity at low cost.

*Available only as a concentrate assaying not less than 99%, packed in bottles of 1 and 8 lbs. net or carboys.

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CURRENT PRICES

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
Mar., '43, $0.900 Mar., '44, $0.882 Mar., '45, $0.871

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Acetaldehyde, 99%, drs. wks. lb.	.11	.14	.11	.14	.11	.14
Acetic Anhydride, drs, ...lb.	.11½	.13	.11½	.13	.11½	.13
Acetone, tks, delv .....lb.	...	.07	...	.07	...	.07
ACIDS						
Acetic, 28%, bbls ....100 lbs.	3.38	3.63	3.38	3.63	3.38	3.63
glacial, bbls. .....100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks. .....100 lbs.	6.93	7.25	6.93	7.25	...	6.93
Acetylsalicylic, Standard USP .....lb.	.40	.54	.40	.54	.40	.54
Benzoic, tech, bbls. .....lb.	.43	.47	.39	.47	.39	.47
USP, bbls, 4,000 lbs. up lb.	...	.54	...	.54	...	.54
Boric tech, bbls, c-l,....ton *a*	...	109.00	...	109.00	...	109.00
Chlorosulfonic, drs, wks. ..lb.	.03	.04½	.03	.04½	.03	.04½
Citric, USP, crys, gran, bbls, ...lb. *b*	.20	.21	.20	.21	.20	.24
Cresylic 50%, 210-215° frt bs, drs, wks, frt equal gal.	.81	.83	.81	.83	.81	.83
Formic, 85%-90% cbys ...lb.	.10	.11½	.10	.11½	.10½	.11½
Hydrofluoric, 30% rubber, dms. .....lb.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls wks lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls wks ...lb.	.073	.0755	.073	.0755	.073	.0755
Maleic, Anhydride, drs....lb.	.25	.26	.25	.26	.25	.26
Muriatic, 18° cbys ...100 lb.	1.50	2.45	1.50	2.45	1.50	2.45
20° cbys, c-l, wks ..100 lb.	...	1.75	...	1.75	...	1.75
22° cbys, c-l, wks ..100 lb.	...	2.25	...	2.25	...	2.25
Nitric, 36°, cbys, wks 100 lbs. *c*	5.00	5.25	5.00	5.25	5.00	5.25
38°, c-l, cbys, wks 100 lbs. *c*	...	5.50	...	5.50	...	5.50
40°, c-l, cbys, wks 100 lbs. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lbs. *c*	...	6.50	...	6.50	...	6.50
Oxalic, bbls, wks ..... lb.	.11¼	.12½	.11¼	.12½	.11¼	.12½
Phosphoric, 100 lb. cbys, USP .....lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic, tech, bbls ..... lb.	.26	.42	.26	.42	.26	.44
Sulfuric, 60°, tks, wks ..ton	...	13.00	...	13.00	...	13.00
66°, tks, wks .....ton	...	16.50	...	16.50	...	16.50
Fuming (Oleum) 20% tks. wks .....ton	...	19.50		19.50	...	19.50
Tartaric, USP, bbls .....lb.	.70½	.71	.70½	.71	...	.70½
Alcohol, Amyl (from Pentane) tks, delv .....lb.	...	.131	...	.131	...	.141
Butyl, normal, syn, tks lb.	...	.10¾	...	.10¾	.10¾	.14¼
Denatured, CD 14, c-l drs, ... gal. *d*	...	.57	...	.57	...	.54½
Denatured, SD, No.1, tks. *d*	...	.50	...	.50	...	.50
Ethyl, 190 proof tks...gal.	...	17.60	...	17.60	...	11.90
Isobutyl, ref'd, drs ....lb.	...	.086	...	.086	...	.086
Isopropyl ref'd, 91%, dms .....gal.	.39	.66½	.39	.66½	.39	.66½
Alum, ammonia, lump, bbls, wks .....100 lb.	...	4.25	...	4.25	...	4.25
Aluminum, 98-99% ...100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd l.c.l. wks lb.	.08	.12	.08	.12	.08	.12
Hydrate, light .... lb.	.14½	.15	.14½	.15	.14½	.15
Sulfate, com'l. bgs, wks, c-l .....100 lb.	1.15	1.25	1.15	1.25	1.15	1.25
Sulfate, iron-free, bgs. wks .....100 lb.	1.85	2.10	1.85	2.50	1.75	2.50
Ammonia anhyd, cyl .....lb.	...	.14½	...	.14½	...	.16
Ammonium Carbonate, lumps, dms .....lb.	.08½	.09¼	.08½	.09¼	.08¼	.09¼
Chloride, whi, bbls, wks, 100 lb.	4.45	5.15	4.45	5.15	4.45	5.15
Nitrate, tech. bags, wks. lb.	.0435	.0850	.0435	.0850	.0435	.0850
Oxalate pure, grn. bbls..lb.	.27	.33	.27	.33	.27	.33
Perchlorate, kgs ..... lb.	No stocks		.55	.65	.55	.65
Phosphate, dibasic tech, bbls .....lb	.07	.07¼	.07	.07¼	.07¼	.08½
Stearate, anhyd, dms ...lb.	...	.34	...	.34	...	.34
Sulfate, dms, bulk.... ton	28.20	29.20	28.20	29.20	28.20	30.00
Amyl Acetate (from pentane) c-l, drs, delv .....lb.	...	.15½	...	.18½	...	.18½
Aniline Oil, drs .....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Anthraquinone, sub, bbls..lb.	...	.70	...	.70	...	.70
Antimony Oxide, bgs .....lb.	.15	.15½	.15	.15½	.15	.15½
Arsenic, whi, kgs—powd..lb.	.04	.04¼	04	.04¼	.04	.04¼

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal; *c* Yellow grades 25c per 100 lbs less in each case; *d* Prices given are Eastern schedule. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher.

Current Prices

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Barium Carbonate precip, wks bgs. ton	60.00	75.00	55.00	75.00	55.00	65.00
Chloride, tech, cyst, bgs, zone 1 ton	73.00	78.00	73.00	90.00	77.00	90.00
Barytes, floated, bbls. ton	...	36.00	...	36.00	...	36.00
Bauxite, bulk mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	...	.15	...	.15	...	.15
Benzyl Chloride, cbys lb.	.22	.24	.22	.28	.22	.25
Beta-Naphthol, tech, bbls, wks ton	.23	.24	.23	.24	.23	.24
Bismuth metal, ton lots lb.	...	1.25	...	1.25	...	1.25
Blanc Fixe, 66⅔% Pulp, bbls, wks ton	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks, 100 lb.	2.50	3.60	2.50	3.60	2.50	3.60
Borax, tech, c-l, bgs ton	...	45.00	..	45.00	...	45.00
Bordeaux Mixture, drs lb.	.11	.11½	.11	.11½	.11	11½
Bromine, cases lb.	.21	.25	.21	.30	.25	.30
Butyl, acetate, norm drs, lb.	.1790	.1840	.1755	.1945	.1575	.1840
Cadmium Metal lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs. 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ton	50.00	90.00	50.00	95.00	50.00	95.00
Carbonate, c-l bgs, ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs c-l ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75% drs, c-l, ton	18.00	31.50	18.00	31.50	18.00	31.50
Gluconate, U.S.P., drs. lb.	.57	.59	.57	.59	.57	.58
Phosphate, tri, bbls, el lb.	...	.0635	.0635	.0785	.0635	.0785
Camphor, U.S.P., gran, powd, bbls lb.	.69	.71	.68½	.71	.68½	.70½
Carbon Bisulfide, 55-gal drs lb.	.05	.05¼	.05	.05¼	.05	.05¼
Dioxide, cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drms lb.	.73	.80	.73	.80	.73	.80
Casein, Acid Precip, bgs, 100 or more lb.	...	.22	...	.24	...	.24
Chlorine, cyls, lcl, wks, contract lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract lb. y	...	.05¼	...	.05¼	...	.05¼
Liq, tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt Acetate, bbl lb.	...	.83¼	...	.83¼	...	.83¼
Oxide, black kgs lb.	...	1.84	...	1.84	...	1.84
Copper, metal 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls. lb.	.19½	.20½	.19½	.20½	.19½	.20½
Sulfate, bgs, wks crypt. 100 lb.	5.00	5.50	5.00	5.50	5.00	5.50
Copperas, bulk, c-l, wks ton	...	14.00	..	14.00	...	14.00
Cresol, USP, drs lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
Cyanamid, bgs ton	1.52½	1.62½	1.52½	1.62½	1.52½	1.62½
Dibutylamine, c-l, drs, wks lb.	...	61	...	61	...	.61
Dibutylphthalate, drs lb.	.2050	.2659	.1780	.2659	.2060	.2300
Diethylaniline, lb drs lb.	...	.40	...	.40	...	.40
Diethyleneglycol,drs,lcl.wks lb.	.14½	.15½	.14	.15½	.14	.15½
Dimethylaniline, dms.cl.,lcl lb.	.23	.24	.23	.24	.23	.24
Dimethyl phthalate, drs lb.	.1875	.1925	.1875	.1925	.1875	.2050
Dinitrobenzene, bbls lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks lb.	.16	.20	.16	.20	.15	.20
Diphenylamine bbls lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs lb.	...	.35	...	.35	.35	.37
Ethyl Acetate, tks, frt all'd lb.	.1070	.1175	.1070	.1175	.107	.110
Chloride, drs lb.	.18	.20	.18	.20	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms lb.	...	.0891	...	.0891	...	.0842
Glycol, dms, cl. lb.	...	.10	...	.10	...	.10
Fluorspar, No. 1, grd. 95-98% bulk, cl-mines ton	...	37.00	...	37.00	...	37.00
Formaldehyde, bbls, kgs, wks lb.	.0520	.0570	.0520	.0570	.0550	.0575
Furfural tech, dms, c-l,wks lb.	...	.13	...	.13	...	.12½
Fusel Oil, refd, dms, dlvd lb.	.18½	.19½	.18½	.19½	.18½	.19½
Glauber's Salt, Cryst,c.l.,bgs. bbls. wks 100 lb.	1.05	1.25	1.05	1.25	1.05	1.25
Glycerin dynamite, dms, c-l, lb.	...	.14½	...	.14½	...	.18¾
Crude Saponification, 80% to refiners tks lbs.	.09½	.10	.09½	.10	...	.12¾

GUMS

Gum Arabic, amber sorts bgs lb.	.13	.13¼	.12	.14	.13½	.17½
Benzoin Sumatra, CS lb.	.52	1.00	.52	1.00	.52	1.00
Copal, Congo lb.	...	.55¾	...	.55¾	...	.55¾
Copal, East India, chips lb.	...	.12	...	.12	...	.12
Macassar dust lb.	...	.07½	...	.07½	.07½	.11¾
Copal Manila,	.13½	.15½	.13½	.15½	.13½	.15½
Copal Pontianak, bold c-l lb.	...	.23½	...	.23½	...	.23½
Karaya, bbls, bxs, dms, lb.	.15	.46	.15	.46	.14	.40

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

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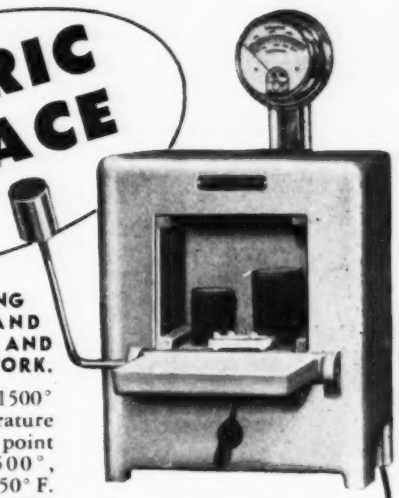

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PORTABLE—Body is aluminum. Total weight, 17 lbs. Muffle chamber, 4" x 3¾" x 3¾"; furnace overall, 9¼" x 13½" x 10½". Supplied with attachment cord. Operates on A.C. and D.C., 115 or 230 V. (*be sure to specify voltage*). Max. power consumption 1200 watts.

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References:

Swiss Bank Corporation, 15 Nassau Street, New York

Current Prices

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Kauri, N Y					
Superior Pale XXX....lb.	...	.65¾	...	.65¾	...	.65¼
No. 3 .....lb.	...	.22	...	.23	...	.22
Sandarac, cs .....lb.	...	.99½	...	.99½	1.40	nom.
Tragacanth, No. 1, cases lb.	4.50	5.00	4.00	5.25	4.00	5.25
No. 3 .....lb.	2.75	3.00	1.10	3.50	1.10	1.20
Yacca, bgs .....lb.	...	.06	.06	.07¼	.06	.07¼
Hydrogen Peroxide, cbys ..lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars..lb.	2.00	2.10	2.00	2.10	2.00	2.10
Lead Acetate, crvst, bbls...lb.	...	.12½	...	.12½	...	.12½
Arsenate, bg, lcl .....lb.	.11½	.12	.11½	.12	.11½	.12
Nitrate, bbls .....lb.	...	.12½	...	.12½	...	.12½
Red, dry, 95%Pb_3O_4, lcl lb.	.09¾	.10¾	.09	.11	.09	.11
97% Pb_3O_4 bbls delv..lb.	.09½	.11	.09¼	.11	.09¼	.11
98% Pb_3O_4, bbls delv..lb.	.09½	.10¾	.09½	.11¼	.09½	.11¼
White, bbls .....lb.	.08¼	.08¾	.08¼	.08¾	.08¼	.08¾
Basic sulfate, bbls, lcl lb.	.07½	.08	.07¼	.08	.07¼	.08
Lime, Chem., wks, bulk..ton	6.25	13.00	6.25	13.00	6.25	13.00
Hydrated, f.o.b. wks ..ton	8.50	16.00	8.50	16.00	8.50	16.00
Litharge, coml, delv, bbls lb.	.08	.09¼	.08	.09¼	.08	.09¼
Lithopone, ordi., bgs.....lb.	.04¼	.04½	.04¼	.04¾	.04¼	.04¾
Magnesium Carb, tech, wks lb.	.06¼	.09¾	.06¼	.09¾	.06¼	.09¼
Chloride flake, bbls, wks c-l .....ton	...	32.00	...	32.00	...	32.00
Manganese, Chloride, Anhyd. bbls .....lb.	.15	.18	.15	.18	.14	nom.
Dioxide, Caucasian bgs, lcl .....ton	...	74.75	...	74.75	...	74.75
Methanol, pure, nat, drs gal *l*	.63	.76	.63	.76	.63	.76
Synth, drs cl.....gal. *m*	.31	.38	.31	.40½	.34½	.40½
Methyl Acetate, tech tks..lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, cyl .....lb.	.32	.40	.32	.40	.31	.40
Ethyl Ketone,tks,frt all'd lb.	...	.08	...	.08	...	.08
Naphtha, Solvent, tks ...gal.	...	.27	...	.27	...	.27
Naphthalene, crude, 74°, wks tks .....lb.	...	.0275	...	.0275	...	.0275
Nickel Salt, bbls, NY.....lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk .....ton	..	16.00	...	16.00	...	16.00
Nitrobenzene, drs, wks ...lb.	.08	.09	.08	.09	.08	.09
Orthonisidine, bbls .....lb.	..	.70	...	.70	...	.70
Orthochlorophenol, drs ...lb.	.25	.27	.25	.32	...	.32
Orthodichlorobenzene, drms lb.	.07	.08	.07	.08	.07	.08
Orthonitrochlorobenzene, wks .....lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks.dms lb.	...	.09	...	.09	...	.09
Paraldehyde, 98%, wks lcl. .....lb.	..	.12	...	.12	...	.12
Chlorophenol, drs .....lb.	.25	.28	.25	.32	...	.32
Dichlorobenzene, wks ..lb.	.11	.15	.11	.15	.11	.15
Formaldehyde, drs, wks.lb.	.21	.22	.23	.24	.23	.24
Nitroaniline, wks, kgs..lb.	.43	.45	.43	.45	.43	.45
Nitrochlorobenzene, wks lb.	...	.15	...	.15	...	.15
Toluenesulfonamide, bbls lb.	...	.70	...	.70	...	.70
Toluidine, bls, wks ....lb.	...	.48	...	.48	...	.48
Pencillin, ampules per 100,000 units	1.92	2.40	1.92	4.50	...	...
Pentaerythritol, tech...lb.	.29	.33	.29	.33	.29	.35½

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast .....gal.	...	11½	...	.11½	...	.11
Naphtha, V.M.P., East tks, wks .....gal.	...	.11	...	.11	...	.11
Rubber Solvents, East, tks, wks .....gal.	...	.11	...	.11	...	.11
Stoddard Solvents, East, tks, wks .....gal.	...	.10	...	.10	...	.09½
Phenol, U.S.P., drs.....lb.	.10½	.11¼	.10½	.11¼	.10½	.13¼
Phthalic Anhydride, cl and lcl, wks .....lb.	.13	.14	.13	.14	.13	.15½
Potash, Caustic, wks, sol lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake, 88-92% .....lb.	.07	.07½	.07	.07½	.07	.07½
liquid, tks .....lb.	...	.02¾	...	.02¾	...	.0275
dms, wks .....lb.	.03	.03½	.03	.03½	.03	.03½
Carbonate, hydrated 83-85% calc .....lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
Chlorate crys, bgs, wks lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs .....lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks .....lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans...lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriate, dom, 60-62-63% K_2O bulk unit-ton...ton	...	.53½	...	.53½	.53½	.56
Permanganate, USP, wks dms .....lb.	.20½	.21	.20½	.21	.20½	.21
Sulfate, 90%, basis, bgs ton	...	36.25	...	36.25	...	36.25
Propane, group 3, tks...gal.	...	.03¼	...	.03¼	..	.03¼
Pyridine, ref., drms .....lb.	.45	.45½	.45	.46	.45½	.46
R Salt, 250 lb bbls, wks lb.	...	.65	...	.65	...	.65
Resorcinol, tech.,drms, wks lb	.68	.75	.68	.75	.68	.75
Rochelle Salt, cryst .....lb.	.43½	.47	.43½	.47	.43½	.47
Salt Cake, dom. blk wks .ton	...	15.00	...	15.00	...	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.

* Spot price is ½c higher.

	Current Market		1944 Low	1944 High	1943 Low	1943 High
Saltpetre, grn, bbls ...100 lb.	8.20	8.60	8.20	8.60	8.20	8.60
Shellac, Bone dry, bbls ..lb. r	.42½	.46	.42½	.46	.42½	.46
Silver Nitrate, 100 oz, bots .....oz.	...	.32⅜	...	.32⅜	...	.32⅜
Soda Ash, 58% dense, bgs, c-l, wks .....100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs cl....100 lb.	1.05	1.13	1.05	1.13	...	1.13
Caustic, 76% flake drms, cl .....100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drms,cl 100 lb.	...	2.30	...	2.30	...	2.30
Liquid, 47-49%, sellers, tks .....100 lb.	...	1.95	...	1.95	...	1.95
Sodium Acetate, anhyd. dms .....lb.	.08½	.10	.05	.10	.05	.06
Benzoate, USP dms ....lb.	.46	.52	.46	.52	.46	.52
Bicarb, tech., bgs., cl., works 100 lb.	1.55	1.90	1.55	2.05	...	
Bichromate, bgs,wks l.c.l. lb.	.07⅞	.08½	.07⅞	.08½	...	.07¾
Bisulte powd, bbls, wks .....100 lb.	3.00	3.60	3.00	3.60	3.00	3.60
35° bbls. wks 100 lb.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, kgs, wks c.l., lb.	...	.06¼	...	.06¼	...	.06¼
Cyanide, 96-98%, wks .lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, wks lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks .....100 lb.	...	2.25	...	2.25	...	2.25
Metasilicate, gran, bbl, wks c-l .....lb.	...	2.50	...	2.50	...	2.50
Nitrate, imp. bgs .... ton	...	33.00	...	33.00	...	33.00
Nitrite, 96-98% bbl. cl. lb.	...	.06¼	...	.06¼	...	.06¼
Phosphate, di. anhyd. bgs. wks. .....100 lb.	6.00	7.25	6.00	7.25	6.00	7.25
Tri-bgs, cryst. wks 100 lb.	2.70	3.40	2.70	3.40	2.70	3.45
Prussiate, yel. bbls, wks lb.	...	.11	.10	.11	.10	.11
Silicate, 52°,drs. wks 100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°. drs. wks. c-l 100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY ..lb.	.06½	.10	.06½	.12	.05	.12
Sulfate tech. Anhyd, bgs 100 lb.	1.70	1.90	1.70	1.90	1.70	1.90
Sulfide, cryst c-l, bbls, wks .....100 lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, wks .....lb.	3.15	3.90	3.15	3.90	3.15	3.90
Starch, Corn, Pearl, bgs .....100 lb	...	4.08	..	4.08	...	3.47
Potato, bgs, cl .....lb.	...	.0637	...	.0637	...	.0637
Rice, bgs .....lb.	no stocks		no stocks		.09½	.10¼
Sweet Potato, bgs ..100 lb.	.09	.09¼	.07½	.09¼	...	.07½
Sulfur, crude, mines ....ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls, kgs .....lb.	.18	.30	.18	.30	.18	.30
Roll, bbls.....100 lb.	2.40	2.90	2.40	2.90	2.40	2.90
Sulfur Dioxide, liquid, cyl lb.	.07	.09	.07	.09	.07	.08
tks, wks .....lb.	...	.04	.04	.06	.04	.06
Talc, crude, c-l, NY .....ton	...	13.00	...	13.00	...	13.00
Ref'd, c-l, NY .....ton	13.00	21.00	13.00	21.00	13.00	21.00
Tin, crystals, bbls, wks ..lb.	no stocks		no stocks		no stocks	
Metal .....lb.	...	.52	...	.52	...	.52
Toluol, drs, wks .....gal.	...	.33	...	.34½	...	.33
tks, frt all'd .....gal.	...	.28	...	.28	...	.28
Tributyl Phosphate, dms lcl, frt all'd .....lb.	...	.49	...	.49	...	.47
Trichlorethylene, dms, wks lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate .....lb.	.24	.54½	.24	.54½	.24	.54½
Triethylene glycol, dms...lb.	.18½	.19½	.18½	.26	...	.26
Triphenyl Phos, bbls .....lb.	.31	.32	.31	.32	.31	.32
Urea, pure, cases .....lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs .....lb.	no stocks		.25	nom.	.25	.26
Bees, bleached, cakes....lb.	...	.60	...	.60	...	.60
Candelilla, bgs crude...ton	.35	.36	.34½	.48	.38	.48
Carnauba, No. 1, yellow, bgs, ton .....lb.	...	.83¼	...	.83¼	...	.83¼
Xylol, Indus. frt all'd, tks, wks .....gal.	...	.27	...	.27	...	.27
Zinc Chloride tech fused, wks .....lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer, bgs, wks..lb.	.07¼	.07½	.07	.07½	.07	.07½
Sulfate, crys, bgs, ..100 lb.	3.40	4.15	3.40	4.35	3.60	4.35

Oils and Fats

Babassu, tks, futures ....lb.	...	.111	...	.111	...	.111
Castor, No. 3, bbls .....lb.	.13¾	.14¼	.13¾	.14¼	.13¾	.14¼
China Wood, drs, spot NY lb.	.39	.40	.39	.40	...	.39
Coconut, edible, drs NY ..lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms..gal.	.85	.88	.85	.90	...	.90
Corn, crude, tks, wks ....lb.	..	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l ...lb.	...	.1510	.1510	.1560	...	.1530
Menhaden, tks .....gal.	...	.1225	...	.1225	...	.1225
Light pressed, drs l.c.l. lb.	...	.1300	...	.1200	.1305	.1307
Palm, Niger, dms .....lb.	...	.0865	...	.0865	...	.0865
Peanut, crude, tks, f.o.b. wks .....lb.	...	.13	...	.13	...	.18
Perilla, crude dms, NY...lb.	no stocks		...	.245	...	.245
Rapeseed, New Orleans, bulk .....lb.	...	.1156½	...	.1156½	...	.1150
Red, dms .....lb.	.13¼	.14¼	.13¼	.14¼	...	...
Soy Bean, crude, tks, wks lb.	...	.1175	...	.1175	...	.1175
Tallow, acidless, bbls ....lb.	...	.14¼	...	.14¼	...	.14¼
Turkey Red, single, drs ..lb.	.9½	.11	.9½	.14½	.10	.14½

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Between the Lines

(*Continued from page 657*)

oped in the Appalachian area during certain times. A number of sheet glass concerns are reported to have equipped their plants to make gas from coal. (Currently the coal shortage is forcing industrial plants generally, when equipped with gas facilities, to use gas rather than coal, by WPB order.)

Due to various factors, companies having several plants have in some cases consolidated factory operations. In addition to the shortages of certain chemicals referred to, costs of many raw materials have advanced.

One, and perhaps other of the companies, produce paint, varnishes, cement, besides other by-products, in addition to making glass.

The Commission is expected to make recommendations regarding tariff and other legislation, as stated here. However, its members are inclined to the belief that cartelization, particularly abroad, may have had more effect on international trade in the past than that exerted by customs tariffs.

"For several years before the war," the Commission has reported, "European producers had maintained associations or cartels which exercised strict control over production, price policies, and sales in both domestic and export markets.

"Some of the members of the cartels had financial and patent connections with certain producers in the United States. Foreign producers sometimes received licenses to use American manufacturing processes on condition that they would not export glass to the United States. Similar restrictions may have been imposed upon United States exports by foreign holders of patents used in this country."

The Commission reports a high degree of cartelization in the prewar glass industries of Czechoslovakia, Belgium, Germany, and perhaps others. It states that the European glass cartels, particularly of Belgium and Czechoslovakia, have been more aggressive in the past in opening foreign markets than have American exporters, and also it believes that European cartels may have somewhat curtailed American exports.

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"WE"- EDITORIALLY SPEAKING

LAWRENCE W. BASS, president of the A. I. Ch. E., recently made some commonsense remarks about plastics:

"The chemical industry is realistic in its attitude towards its products. It knows that plastics have a brilliant future—that they will be produced in much greater volume and in much greater variety, and that they will find more and more applications in industry and in consumer goods. But chemical executives do not think that the minute the war is over your lives will be completely changed by plastics—and you shouldn't either."

WE ENJOY the observation of Harvard's Dean Briggs when the Bachelor of Science degree was established: "It does not guarantee that the holder knows any science, but it does guarantee that he does *not* know any Latin."

WE DON'T PRETEND to be art critics, but the tire-tread model shown below looks better to us than a lot of the more ethereal abstractions on display in the salons.

It is the work of Miss Chloe DeLong, whose seven years of artistic training have

qualified her for the distinction of being the first "tire sculptress" in the world—so far as anyone knows. Her unusual job at Firestone saves many man-hours, and even more dollars, ordinarily expended in the designing of a new tread.

Miss DeLong's position evolved from the realization that a proper visualization of a tire could not be gotten from a mechanical drawing. To avoid building steel molds to make rubber models—a process requiring three weeks—this short cut was developed. Miss DeLong takes the proposed designs (either her own or those of the engineering staff), and models exact full-sized sections of the finished tire in green plasticine. A coat of black paint, which she sprays on the completed sculpture, makes it look like rubber. The whole job takes only one or two days.

A bust of John W. Thomas, head of the company, is one of her "extra-curricular" sculptures which will be on display in the new Firestone research laboratory, to be opened in May.

Fifteen Years Ago
From Our Files of April, 1930

Dr. Samuel E. Sheppard, assistant director, research department, Eastman Kodak Co., Rochester, is awarded the William H. Nichols Medal, New York section, American Chemical Society, at a joint meeting of the various chemical societies in the Chemists' Club, New York, March 14.

Dr. William H. Nichols' will filed for probate March 14, indicated that the late chairman of the board, Allied Chemical & Dye Corp., had left more than $1,000,000 to be inherited by nineteen public institutions.

Dry Ice Corp. of America closes long-term contract with Commercial Solvents Corp., which makes available to the former 120 tons of pure carbon dioxide daily for the manufacture of "dry ice."

Butyl acetate anti-dumping order is issued by the Secretary of the Treasury, March 3, against butyl acetate from Germany, following an investigation which showed that the sales price of the imported article in the United States is lower than the market value in Germany.

Standard Oil Co. of New Jersey and the I. G. Farbenindustrie jointly organize a new company to take over from the Standard I. G. Co., the rights to the hydrogenation processes for cracking crude oil. The hydrogenation processes will be offered for licensing to all petroleum refiners who are considered able to make commercial use of them.

Ethyl acetate shipments must be reported daily to the Prohibition administration, according to an order issued March 26 by James M. Doran, Commissioner of Prohibition. The purpose of requiring daily reports of shipments of ethyl acetate is said by Commissioner Doran to be to afford information to Prohibition administrators, which will enable them promptly to follow up such shipments in cases where for any reason this action seems necessary.

Chemical Foundation, Inc., is awarded all rights to royalties accruing from patents seized from enemy aliens during the war and licensed to other companies, according to decision of United States Circuit Court of Appeals at Philadelphia, in case involving right of the Chemical Foundation to royalties paid the government for patents licensed to the DuPont Company.

HOW OUR ENEMIES continue to make armor and ammunition without copper, nickel, chromium, and other essential alloy metals has been a puzzle. The Germans have been ingenious in finding substitutes and in reclaiming alloy scrap, and they seem to have a plentiful supply of tungsten.

The Japs apparently have metals to burn—nor are we entirely innocent. Metallurgical analysis shows that a considerable part of the Japanese arsenal was sold to them by us in the form of scrap.

"But if the salt have lost his savor, wherewith shall it be salted?"—St. Matthew 5:13.

WE WERE INSTANTLY reminded of this portion of Scripture when one of the manufacturers of ion-exchange materials told us of a recent experience: A salter of haddock called them to ask if their chemicals would make the brine for salting the haddock less salty!

THERE WAS a great hulabaloo a few months ago about the synthesis of quinine. It was a brilliant academic achievement, to be sure, but its practical importance was exaggerated in the popular press. Estimates of production costs by the described method ran to well over $1,000 per pound, while the natural material is worth about $5.

Now the American Medical Association has declared that synthetic atabrine is superior in most cases anyhow. Maybe we just didn't know when we were well off.

EVEN AN OLD SALT like a barnacle has trouble keeping its footing on a slippery deck. We read that a new plastic paint applied to ship bottoms keeps them so slippery that barnacles can't get a foothold.

PART 2: PATENTS AND TRADEMARKS

Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of patents are available from the Patent Office at 10 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

From Official Gazette—Vol. 570, Nos. 4, 5—Vol. 571, Nos. 1, 2 (Jan. 23-Feb. 13) p. 561

*Chemical Specialties

Insecticidal composition comprising active ingredient selected from plant body of comminuted derris root, cube root, timbo root, and pyrethrum flowers and a terpene haloacyl ester for enhancing toxic effect. No. 2,367,155. Friar Thompson, Jr. to Hercules Powder Co.

Making compressible gasket material of asbestos for gasket manufacture and a binder, comprising preparing fatty acids emulsion by mixing solution of long chain alcohol sulfates and bentonite with fatty acids, adding emulsion so produced to asbestos fiber and water, adding a pigment dispersion. No. 2,367,181. Wilburn Bernstein, Thomas Milka and Stephen Lillis and Otha Colwell to Victor Manufacturing & Gasket Co.

Abrasive article. No. 2,367,286. George Keeleric.

Cathode including metal part adapted to be heated to a temperature of effective electron emission. No. 2,367,331. Ralph Bondley to General Electric Co.

Cathode including emissive part to be maintained at elevated temperature, a support for said cathode, and a metallic connection of low thermal conductivity between said part and said support. No. 2,367,332. Ralph Bondley to General Electric Co.

Abrasive composition consisting of diamond particles dispersed throughout metallic matrix, said matrix consisting of iron-carbon alloy and diamonds being retained in matrix, by thin film surface coating of a platinum group metal. No. 2,367,358. Hermann Kott and Murray Yawitz to Fish-Schurman Corp.

Curing brier for pipe manufacture consisting in subjecting block cut from rhododendron, kalmia or other brier burl, to water to remove acids, resins or other soluble constituents, transferring said blocks to an aqueous solution containing boric acid. No. 2,367,360. David Lavietes.

Sealing composition including, cellulose ether in physical solution in liquid solvent, a plasticizer dissolved in ether solution in excess of its solubility in ether, whereby when liquid solvent evaporates, excess of plasticizer will separate from ether. No. 2,367,375. Laurence Rector and Charles Cron.

Chewing gum material comprising a crystalline maleic adduct of a rosin compound selected from rosin acids and rosin acid esters and a gum selected from chicle and rubbers. No. 2,367,380. George Spiller to Hercules Powder Co.

Forming abrasive composition consisting of small particle sized diamonds dispersed throughout a metallic matrix. No. 2,367,404. Hermann Kott to Fish-Schurman Corp.

Forming abrasive compositions consisting of small particle sized diamond fragments dispersed throughout a metallic matrix which comprises using as an adherent thin film of a platinum-group metal and pure nickel metal powder. No. 2,367,405. Hermann Kott to Fish-Schurmann Corp.

Abrasive composition consisting of metallic base member containing sintered mixture metal powders, consisting of metals of group Cu, Au and Ag, indium, Mn or Ni, balance iron containing eutectoid percentage of carbon. No. 2,367,406. Hermann Kott to Fish-Schurmann Corp.

Making intaglio photogravure printing plate, which comprises applying to waterproof paper base heavy photosensitive casein coating, and locating on coating thin grease-receptive areas of a water-insoluble polyvinyl alcohol. No. 2,367,420. William Mullen to Lithomat Corp.

Forming end closure on a flexible cigar container of rubber hydrochloride film. No. 2,367,443. James Snyder to Wingfoot Corp.

Lead-acid type of storage battery plate having an expander consisting of ammoniated sulphite waste liquor solids. No. 2,367,453. Harland Wilson to The Electric Auto-Lite Co.

Increasing decolorizing properties of a synthetic hydrated magnesium silicate decolorizing material, which comprises subjecting material in finely divided condition to contact with a water-soluble iron salt. No. 2,367,496. Alexander Greentree to Lyle Caldwell.

Chill-proofing whisky having insoluble material therein, which consists in mixing fine activated carbon with whisky to provide for adsorption of insoluble material. No. 2,367,557. Harry Atwood.

Aniline ink comprising an ink base, said ink base containing hydrogenated rosin, and dye base, said dye base containing mordant. No. 2,367,581. George Hogg to Hercules Powder Co.

Photoflash lamp provided with a radiation-permeable envelope comprised of a material of character of organic plastic. No. 2,367,583. Oliver Hopkinson, Jr. and Paul Tully to Westinghouse Electric & Manufacturing Co.

Tanning skins or hides which comprises immersing in an acid bath containing a tanning agent. No. 2,367,589. Elbert Ladd to United States Rubber Co.

Electric discharge lamp comprising cylindrical envelope formed of silicious material, and of material of higher melting point than silicious material and selected from pure, fused, light-transmitting materials more refractory than silica. No. 2,367,595. John Marden to Westinghouse Electric & Manufacturing Co.

Furnace for temperatures higher than 2000° C. No. 2,367,617. Emilio Romanelli and Frederic Sutter to Westinghouse Electric & Manufacturing Co.

Liquid adhesive composition comprising butadieneacrylonitrile copolymer containing acrylonitrile, and toughener for butadiene-acrylonitrile copolymer consisting of copolymer vinyl chloride and vinyl acetate. No. 2,367,629. Jan Teppema and Joseph Manning to B. B. Chemical Co.

*Coatings

Coating composition including, base solution comprising a cellulose derivative selected from cellulose nitrate, a cellulose acetate, etc., dissolved in liquid solvents and blown castor oil admixed with base solution. No. 2,367,376. Laurence Rector and Charles Cron.

Film-forming composition selected from cellulose organic acid ester selected from cellulose propionates, cellulose butyrates, cellulose acetate butyrates. No. 2,367,503. Walker Hunter, Jr., Howard Tanner, and Robert Gillmor to Eastman Kodak Co.

*Dyes, Stains

Preparing dyestuff which comprises coupling diazotized para-nitro-aniline to para-chloro-phenol, reducing product with sodium disulfide, isolating it, and acetylating with acetic anhydride. No. 2,366,034. Nicholas Letang to E. I. du Pont de Nemours & Co.

Securing uniform dyeing and drying of fibers which comprises contacting fibers with a color-containing composition adapted to penetrate fibers and passing color-contacted fibers through an alternating electrostatic field to produce internal heating of fibers whereby the dyeing and drying is completed. No. 2,366,347. Henry Millson to American Cyanamid Co.

Metalized azo dyes being complexes of metals of atomic weight from 52 to 64 and azo dyes. No. 2,366,633. Robert Long to American Cyanamid Co.

Tetrazotizing 2,2-dichlor-tolidine-5,5'-disulfonic acid and coupling each diazo group thereof to an azo dyestuff coupling component. No. 2,367,053. William Reynolds, Swanie Rossander and Donovan Kvalnes to E. I. du Pont de Nemours & Co.

Azo dyestuffs and their manufacture. No. 2,367,072. Jack Thurston to American Cyanamid Co.

*Equipment

Temperature compensated condition responsive measuring system. No. 2,365,706. George Keinath.

Apparatus for separating solid materials of different specific gravities by means of a liquid suspension. No. 2,365,734. Klaas Tromp.

Re-useable filtering element in a filter for arresting solid matter particles carried by oil or other liquids. No. 2,365,766. John Levier to Oscar Levier.

Vacuum absorption refrigeration apparatus. No. 2,365,797. Francis Bichowsky.

Inertia damping arrangement for measuring instruments. No. 2,365,806. Leon Dewan, one-half to Percival Andrews.

Nitrogen-fixing, gas-producing, silicon-reducing hot blast furnace, No. 2,365,868. Richard Franchot to Ferro Nitrogen Corp.

Waste heat boiler. No. 2,365,878. Lyman Huff to Universal Oil Products Co.

In a distributor molded from dielectric material, a compartment forming enclosure for a high tension electric spark, the interior of compartment having a thin enamel coating, being melamine resin. No. 2,365,925. Emil Zoerlein, John McCloud and John Mickey to Ford Motor Co.

Plastic distributor cap having high-tension conductors imbedded therein, plastic composed of melamineformaldehyde resins and characterized by high resistance to surface deterioration under tracking. No. 2,365,926. Emil Zoerlein, John McCloud and John Mickey to Ford Motor Co.

Hydraulic thermal element containing mercury for temperatures up to 1200° F. and consisting of a bulb, capillary tubing and an actuating element, said tubing and bulb being formed of an alloy steel of chromium, silicon, molybdenum, carbon, and iron. No. 2,366,091. Samuel Eskin to Robertshaw Thermostat Co.

Apparatus for separating an oil and gas emulsion. No. 2,366,302. Robert Welch to Nowery Smith, as Nowery J. Smith Supply Co.

Gas mixer. No. 2,366,322. Norman Foster to Western Products, Inc.

Preparing pipettes or similar tubular articles for renewed use. No. 2,366,369. Joseph Tannenberg.

Device for trapping liquids and solids in gaseous fluids passing through a member having a fluid passage. No. 2,366,428. Lloyd Scott to Eisemann Corp.

Tank fitting. No. 2,366,442. Marion Cunningham to United States Rubber Co.

Evaporator for low vacuum flashing of bituminous oil to produce high melting point bitumen. No. 2,366,551. John Packie and Raymond Bittner to Standard Oil Development Co.

Device for extinguishing fires particularly such as caused by incendiary bombs. No. 2,366,692. Henry Brandt.

Logging bore holes comprising establishing uniform temperature conditions within the fluid in bore hole, lowering a pair of spaced electrodes within fluid, measuring variations in electrical conductivity of the fluid. No. 2,366,694. John Bender to McCullough Tool Co.

Apparatus for generating and superheating steam. No. 2,366,717. Martin Frisch to Foster Wheeler Corp.

Vapor generating apparatus. No. 2,366,718. Martin Frisch to Foster Wheeler Corp.

Vapor generating apparatus. No. 2,366,719. Martin Frisch to Foster Wheeler Corp.

Vapor generating apparatus. No. 2,366,720. Martin Frisch to Foster Wheeler Corp.

Capsule handling apparatus. No. 2,366,886. Sidney Van Tuyl to American Tag Co.

Apparatus for clarifying fluids. No. 2,366,903. Harold Harms and Avery Harlan to Honan-Crane Corp.

Cylindrical floating roof storage tank for liquids. No. 2,366,911. Wilbur Laird.

Apparatus for removing carbon dioxide from water. No. 2,366,945. James Walker to The American Well Works.

Degreasing apparatus. No. 2,366,949. Joseph Woppman, Herman Hummel and Albert Newman to Curtiss-Wright Corp.

* *Continued from Vol. 569, No. 4; Vol. 570, Nos. 1-3*

Liquefaction and rectification column. No. 2,366,958. Wolcott Dennis to Air Reduction Co. Inc.

Apparatus for shaping objects by plastic deformation. No. 2,367,015. Herman Finzel and Heinrich Maykemper; said Finzel to Clearing Machine Corp.

Temperature indicator. No. 2,367,065. Frederick Sias to General Electric Co.

Specific gravity testing device. No. 2,367,080. Isaac Russell Wilbar.

Combustion device for burning solid fuels rich in gases. No. 2,367,165. Per Anton Astradsson.

Boiler Conditioning apparatus. No. 22,590. Frank Miller to Franclare Co.

Vapor generator. No. 2,367,193. John Blizard to Foster Wheeler Corp.

Liquid circulation system comprising a body to be heated, a heat radiator, inflow and outflow circulating pipes, etc. No. 2,367,197. Percy Graham Caldwell.

Apparatus for injecting plastic compound. No. 2,367,204. Walter Cousino to Chrysler Corp.

Joining two objects of ductile material which comprises inserting one of objects into an opening in second, placing a high explosive charge around and in form fitting contact with outside of outer object, exploding charge, and effecting junction. No. 2,367,206. Clyde Davis to E. I. du Pont de Nemours & Co.

Continuous flow type, liquid condensing apparatus comprising an evaporating chamber, etc. No. 2,367,215. Fred House to Buffalo Foundry & Machine Co.

Acetylene generator with vibrating feed valve. No. 2,367,240. Carl Smith.

Hydrometer float element for testing specific gravity of radiator antifreeze solutions having specific gravity heavier than water and other solutions having specific gravity lighter than water. No. 2,367,268. Leo Edelmann.

Operating a countercurrent powdered catalyst system. No. 2,367,281. Everett Johnson to Standard Oil Co.

X-ray shield containing resinous material and metallic particles and carbon black as dispersing agent for particles to increase electrical resistance of shield. No. 2,367,296. Raymond Lutz to Western Electric Co. Inc.

Apparatus for regenerating contact material. No. 2,367,351. Charles Hemminger to Standard Oil Development Co.

Combined elevator and sampler for plant products. No. 2,367,397. Orman Harlow to Brogdex Co.

Gas generator. No. 2,367,401. U. L. Jones.

Lining for tube mills or crushing mills containing balls or similar crushing bodies. No. 2,367,464. Jacques Fernand Henricot.

Vibratory separator. No. 2,367,478. Juan Wiesbach.

Liquid meter for a liquid under pressure. No. 2,367,543. Stanley Udale to George M. Holley and Earl Holley.

Flowmeter. No. 2,367,544. Stanley Udale to George Holley and Earl Holley.

Electric hygrometer with electrical resistance element comprising thin layer of homogeneous mixture of plaster of Paris and glycerine. No. 2,367,561. George Bouyoucos to Michigan State Board of Agriculture.

*Explosives

Gas-pressure-generating cartridge for operation of a gas-pressure-operated mechanical device, wherein gas producing charge comprises grains of a colloided nitrocellulose propellent powder, said grains having been surface-treated by application of combustion-moderating agent which is a high boiling gelatinizer for nitrocellulose. No. 2,366,165. Edward Whitworth and Thomas Thomson to Imperial Chemical Industries Ltd.

Apparatus for continuous purification of tetryl waste acid. No. 2,366,309. George Batchelder, Ralph Featherer and Jesse Hughes to E. I. du Pont de Nemours & Co.

Composition for activating dry cellulose derivative and resinous cements comprising from dynamite cellulose nitrate a 3% acetone solution of which has viscosity of 40 to 200 seconds, and a liquid volatile vehicle containing solvent for cellulose nitrate and dry cement. No. 2,366,353. Earle Pitman to E. I. du Pont de Nemours & Co.

Poaching process in manufacture of nitrocellulose comprising boiling nitrocellulose in aqueous alkaline solution and boiling nitrocellulose in water, and washing with water, employing a slurry containing nitrocellulose. No. 2,366,880. Raphael Stern to Hercules Powder Co.

Volumetric measuring and delivering device for handling explosive powders. No. 2,367,031. John Johnson, Jr. to Triumph Explosives, Inc.

Transferable, insulated container for recovery of solvent from smokeless powder. No. 2,367,487. Gild Desetti and Walter Dew, Bill Mackey and Richard Woodbridge, Jr., to E. I. du Pont de Nemours & Co.

*Foods

Preserving fruit and vegetable juices which comprises extracting juice from produce while excluding all light from juice, and, while continuously excluding all light, enclosing said juice in a container which excludes all light. No. 2,365,674. Nathaniel Blumenkranz.

Preparing sausages comprising treating unstuffed animal casings with small amount of a proteolytic enzyme. No. 2,365,728. Gustav Rademske to Armour & Co.

Apparatus for bleaching flour. No. 2,365,767. Hugh McDonald to Pillsbury Flour Mills Co.

Preserving vitamin C which comprises: subjecting to action of a vacuum a natural substance containing vitamin C; and exposing vacuumized substance to catalytic action of a water-insoluble metallic oxide while subjecting to an electric current until structure of vitamin C is changed. No. 2,365,924. Ralph Willard to Sunlite Fruit Juices Ltd.

Preparing a hard tablet from expressed juices selected from fruit and vegetable juices and mixtures thereof. No. 2,366,591. John Bruce to Bruce's Juices, Inc.

Detaching epidermal layer of bran coat material from certain cereal grains without material alteration of the natural grain berry conformation. No. 2,366,711. Theodore Earle.

Food package comprising a tin coated ferrous metal container, said container being lined with a non-crocking coating of plastic containing flake aluminum as pigment, this flake aluminum being free of fatty and waxy coatings. No. 2,366,850. Morris Gardner to Pittsburgh Plate Glass Co.

Hydrochloric acid salt of a proteinous material derived from sulfhydryl compounds isolated from a cereal grain, said salt being crystallizable and yielding on hydrolysis 50 percent of nitrogen as amino acids of group consisting of arginine, cystine and tyrosine. No. 2,366,952. Arnold Balls, Walter Hale, and Thomas Harris to Claude R. Wickard, as Secretary of Agriculture of the U. S. of America.

Conserving citrus oil flavoring material and retarding development of terpene flavor therein, which comprises dissolving food gelatin and solid edible acid material in water, forming dispersion in solution of citrus flavoring oil, and converting dispersion into dry gelatin form. No. 2,367,269. Chester Epstein and Nathan Gotthoffer to Grayslake Gelatin Co.

Recovery of riboflavin from solutions having a riboflavin concentration of at least 20 ug. per ml. No. 2,367,644. George Hines, Jr. to Commercial Solvents Corp.

Recovery of riboflavin from solutions having a riboflavin concentration of at least 20 ug. per ml., comprising adding to solution a finely-divided nonadsorbent siliceous substance and a soluble reducing agent **having an E°. No. 2,367,646. Graham McMillan** to Commercial Solvents Corp.

*Industrial Chemicals, Inorganic

Producing aluminum hydroxide with low-silica content from sintered or fused materials containing lime, alumina and high silica content, which comprises extracting with an aqueous solution containing sodium carbonates, in the form of sodium bicarbonate. No. 2,365,702. Travis Hignett to Tennessee Valley Authority.

Preparing a carbon catalyst body by partially oxidizing a porous carbon char in an oxidizing medium below its ignition temperature in such medium, and thereafter heating the carbon under nonoxidizing conditions. No. 2,365,729. Erwin Schumacher and George Heise to National Carbon Co. Inc.

Hydrating slow slaking limes which comprises feeding quicklime and water into a pressure vessel. No. 2,365,734. Irving Warner to Warner Co.

Separating sylvite from a pulp which comprises employing collector selected from aliphatic amines containing a straight chain hydrocarbon group of at least 7 carbon atoms which are devoid of surface active properties, which resides in distributing in said pulp auxiliary agent selected from water-soluble and colloidally dispersible proteinaceous protective colloids. No. 2,365,805. Allen Cole to Minerals Separation North American Corp.

Forming a low density mineral wool felt. No. 2,365,970. Gale Pearce to Johns-Manville Corp.

Production of magnesium hydroxide from liquors containing convertible magnesium salts by precipitation with a basic reacting liquor. No. 2,366,052. Francis Pickett to Ocean Salts (Products) Ltd.

Producing anhydrous tungstic acid in bulky, loose, finely divided form, by reaction between tungstate solution and solution of another acid. No. 2,366,250. Ted Foulke and Helen Holtan to General Electric Co.

Preparing nitrosyl chloride substantially free of water and elemental chlorine. No. 2,366,518. John Grebe and Harold Robinson to The Dow Chemical Co.

Treating aqueous solution of alkali metal hydroxide produced from cell liquor made in diaphragm-type caustic-chlorine cells to remove the color which develops on concentration of cell liquor which comprises heating solution above 200° C. and at a superatmospheric pressure. No. 2,366,546. William Nichols to Westvaco Chlorine Products Corp.

Synthesizing hydrogen chloride from chlorine and hydrogen contaminated with moisture and oxygen, resulting in a product having a dew point above 28° C. No. 2,366,670. Aylmer Maude to Hooker Electrochemical Co.

Combining exfoliated vermiculite with a colloidal agent, selected from bentonite and colloidal magnesium silicate until resinoid emulsion is formed. No. 2,366,769. Lyle Casmire to Margaret Schirm.

Leavening acid comprising calcium acid pyrophosphate and alkali metal hexa metaphosphate. No. 2,366,857. Rudolph Hurka to Monsanto Chemical Co.

Removing color bodies from and purifying a ferricyanide in aqueous solution which comprises reacting an alkaline substance therewith. No. 2,366,915. Louis Lento, Jr. and Alfred Houpt to American Cyanamid Co.

Manufacturing lead iodide which comprises diluting iodine vapor with inert gas and passing diluted vapor through molten lead. No. 2,366,953. Harold Beatty to Ethyl Corp.

Obtaining pure glycerol from fermented carbohydrate solutions by distillation, which consists in treating impure glycerol solutions with formaldehyde. No. 2,366,990. James Wallerstein and Ralph Alba to The Overly Bio-Chemical Research Foundation, Inc.

Obtaining copper sulfides and a tin salt from a tin-copper alloy which comprises heating acid solution containing copper salt and tin salt in contact with the alloy and elemental sulfur. No. 2,367,022. John Hay to The Harshaw Chemical Co.

Producing copper chloride from metallic copper and chlorine. No. 2,367,153. Carl Swinehart and John Hay to The Harshaw Chemical Co.

Production of anhydrous hydrogen chloride comprising contacting an aqueous solution of hydrogen chloride with sulphuric acid, etc. No. 2,367,301. Albert Mohr to Stauffer Chemical Co.

Separation and recovery of a molybdate and alumina from spent catalyst which comprises introduction of alkali metal salt to combine with molybdenum content of catalyst. No. 2,367,506. Alan Kissock.

*Industrial Chemicals, Organic

Production of a saturated substituted succinic acid anhydride which comprises reacting octadecylene with maleic acid anhydride in presence of elemental iodine. No. 2,365,703. Edward Jahn to Shell Development Co.

Making aliphatic amines by condensing an alcohol chosen from open chain primary and secondary aliphatic alcohols containing at least two and not more than eight carbon atoms with ammonia. No. 2,365,721. John Olin and James McKenna to Sharples Chemicals, Inc.

Iodo-sugar derivatives and method of preparing same. No. 2,365,776. Albert Raymond and Elmer Schroeder to G. D. Searle & Co.

6-Iodo-d-galactose. No. 2,365,777. Albert Raymond and Elmer Schroeder to G. D. Searle & Co.

Unsaturated aliphatic tertiary olefin monosulphonates, having sulphonate group attached to a carbon atom in an allyl position. No. 2,365,783. Chester Suter to The Procter & Gamble Co.

Producing sirupy concentrate of liquefied starch which consists in adding farinaceous material to water and progressively gelatinising and liquefying starch by heat and action of amylase. No. 2,365,788. Christopher Henry Warburton.

Preparing alpha, beta-dihaloaliphatic carboxylic acids which comprises halogenating a nitrile of acrylic series in an acidic medium. No. 2,-

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365,808. James D'Ianni to Wingfoot Corp.

Producing an N,N-dialkylamino alcohol from an aliphatic polyhydric alcohol having at least one primary carbinol radical and at least one secondary carbinol radical. No. 2,365,825. Lucas Kyrides to Monsanto Chemical Co.

Concentration of aqueous solution containing about 33% of acetic acid, which comprises extracting with medium comprising 70% by volume of ethyl acetate and 30% by volume of benzene. No. 2,365,828. John Loud to Celanese Corp. of America.

Oxidizing hydrocarbons to produce formaldehyde. No. 2,365,851. Charles Thomas to Monsanto Chemical Co.

Insecticidal composition comprising as active agent tri-beta-cyanoethyl indene and a carrier. No. 2,365,936. Herman Bruson to Rohm & Haas Co.

Wax substituted diaryl dithiophosphoric acids and salts thereof. No. 2,365,938. Elmer Cook and William Thomas, Jr., to American Cyanamid Co.

Making indole wherein aqueous solution of indoxyl and alkali metal hydroxide is heated to a reaction temperature in a closed container, in presence of ionizable compound of a metal. No. 2,365,966. John Livak to The Dow Chemical Co.

Liquid phase production of chlorinated nitro alkanes which comprises adding to solution of a metal hydroxide selected from alkali and alkaline-earth metal hydroxides, sufficient chlorine to bring pH to between 10 and 14, and adding to resultant metal hypochlorite a nitroalkalene. No. 2,365,981. John Tindall to Commercial Solvents Corp.

Manufacture of 2-p-oxazinylmethyl-5:6-benzo-1:4-dioxane by interacting morpholine with an ester of 2-hydroxymethyl-benzodioxane. No. 2,366,102. Adolf Grun to J. R. Geigy A. G.

Sulphonium salts. No. 2,366,176. Edgar Britton and John Hansen to The Dow Chemical Co.

3,3'-dinitro-4,4'-bis-dimethylaminotriphenylacetonitrile. No. 2,366,179. Lyman Chalkely.

Alpha, alpha'-di-(halophenyl)-dialkyl ether. No. 2,366,203. John Livak to The Dow Chemical Co.

5-substituted-5 5-(2-thienyl) hydantoins. No. 2,366,221. James Spurlock.

Certain water-soluble high molal oxyalkylated esters, and method of making same. No. 2,366,239. Melvin De Groote and Bernhard Keiser to Petrolite Corp. Ltd.

Water-soluble high molal oxyalkylated esters, and method of making same. No. 2,366,240. Melvin De Groote and Bernhard Keiser to Petrolite Corp. Ltd.

Making alkyl esters of alkoxyacetic acid which comprises hydrogenolyzing glyoxylic acid alkyl ester dialkyl acetal in presence of a nickel hydrogenation catalyst. No. 2,366,276. Raymond McNamee and Louis MacDowell to Carbide & Carbon Chemicals Corp.

Producing a compound of formula R1 R2CH-CR3=C+CHR4 wherein each of R1, R2, R3, and R4 is one of a group consisting of hydrogen and an alkyl radical comprising hydrogenating in presence of an activated iron catalyst a compound of formula R1R2C=CR3-C+CR4. No. 2,366,311. Frederick Breuer to The United Gas Improvement Co.

Conversion of 8-hydroxymenthenes to products of decreased apparent unsaturation but of similar hydroxyl content, a mixture of 8-hydroxymenthane and 8-hydroxycymene. No. 2,366,409. Alan Johnston to Hercules Powder Co.

Preparing amino sulfonic acids substituted in amino group by an acyl radical. No. 2,366,452. Ludwig Mack to General Aniline & Film Corp.

Synthesizing di-tertiary alkyl sulphides which comprises contacting tertiary aliphatic mercaptans with Friedel-Crafts type catalyst. No. 2,366,453. Jacob Meadow to Socony-Vacuum Oil Co. Inc.

Manufacture of tetrahydrofuran which comprises contacting tetrahydrofurfuryl alcohol in vapor phase with nickel catalyst. No. 2,366,464. Christopher Wilson to Imperial Chemical Industries Ltd.

Production of long-chain tertiary amines which comprises reducing mixture of formaldehyde and an amine selected from long-chain primary and long-chain secondary amines with formic acid. No. 2,366,534. James Kirby to E. I. du Pont de Nemours & Co.

Separating 2,4 and 2,5-dimethyl phenols from a mixture containing them. No. 2,366,538. Daniel Luten, Jr. and Aldo De Bendictis to Shell Development Co.

Preparing a polyhydric alcohol ester of hydrogenated rosin of reduced stickiness, improved taste, and increased melting point. No. 2,366,589. Joseph Borglin to Hercules Powder Co.

Manufacture of methyl substitution derivatives of 2-methyl-benzodioxane. No. 2,366,611. Adolf Grun to J. R. Geigy A. G.

Making a nitro-phenyl-pyrazolone-carboxylic acid. No. 2,366,616. Charles Harrington to E. I. du Pont de Nemours & Co.

p-Benzoylamino-p'-aminodiphenyl sulphone. No. 2,366,664. James Williams and Richard Roblin, Jr. to American Cyanamid Co.

Esters of 2-butene-1, 4-diol. No. 2,366,667. George Deebel to Monsanto Chemical Co.

Preparing phenyl mercuric nitrate. No. 2,366,683. Harland Young to Industrial Patents Corp.

Oxidizing olefins to olefin oxides. No. 2,366,724. Daniel Gardner to Gardner Thermal Corp.

Oxidizing ethylene or other olefin. No. 2,366,725. Daniel Gardner to Gardner Thermal Corp.

Converting a water-insoluble organic compound to a water-soluble organic compound which comprises subjecting hydrogen group to a reaction with 1,3-dioxolane in presence of an acid catalyst. No. 2,366,737. Donald Loder and William Gresham to E. I. du Pont de Nemours & Co.

Organic acids modified by formaldehyde and glycol, to get an oxygenated organic compound containing an acyl group RCO and dioxolane group. No. 2,366,738. Donald Loder and William Gresham to E. I. du Pont de Nemours & Co.

Making synthetic menthol having taste and odor properties of natural menthol which comprises crystallizing synthetic menthol from spbstantially-de-mentholized Japanese, Chinese peppermint oils and distilled American peppermint terpenes. No. 2,366,749. Alfred Ofner and Eric Kunz to Burton T. Bush, Inc.

Producing a hydroxylated dehydroabietic acid compound containing the hydrocarbon nucleus of dehydroabietic acid. No. 2,367,000. William Campbell to Hercules Powder Co.

Producing an amino dehydroabietic acid compound containing hydrocarbon nucleus of dehydroabietic acid. No. 2,367,001. William Campbell to Hercules Powder Co.

Halogenated compounds derived from dehydroabietic acid. No. 2,367,002. William Campbell to Hercules Powder Co.

Sulphonated methallyl butyl lauramide. No. 2,367,010. Gifford Davis, Donald Price, and John Milligan to National Oil Products Co.

Cleansing creosote from insoluble impurities which comprises maintaining creosote in presence of depressant of class consisting of alkali metal permanganates, and alkali metal dichromates. No. 2,367,024. Victor Hribar to American Lumber & Treating Co.

Production of hydroxy fatty acids, which comprises subjecting a sulfated material selected from sulfated fatty acids, sulfated fatty oils, sulfated fats and sulfated fatty waxes to an acid hydrolysis and subjecting acid-hydrolyzed mass to alkaline hydrolysis. No. 2,367,050. Donald Price and Richard Griffith to National Oil Products Co.

Sulphonamide derivatives of 3-amino-5-methyl-1,2,4-oxadiazole and processes for their production. No. 2,367,056. Richard Roblin, Jr. and Herman Faith to American Cyanamid Co.

Sulphonamide derivatives of 4-amino-3-methyl furazan and methods for their production. No. 2,367,057. Richard Roblin, Jr. and George Anderson to American Cyanamid Co.

Pyridine-3-sulphonamide derivatives and processes for their production. No. 2,367,058. Richard Roblin, Jr. and Richard Clapp to American Cyanamid Co.

Arylazoarolyguanylureas and their salts. No. 2,367,073. Jack Thurston to American Cyanamid Co.

Selective hydrogenation of the carbon-carbon-double bond in alpha, beta-unsaturated ketones, which consists in carrying out reaction in presence of Raney nickel as catalyst. No. 2,367,078. Charles Weizmann.

Treatment of product of partial oxidation of mineral oil containing non-aromatic hydrocarbons. No. 2,367,125. Joseph James to Clarence Byrnes, trustee.

Preparing a citrus juice powder free of enzymes. No. 2,367,131. Herbert Leo and Clarence Taylor to Mutual Citrus Products Co.

Preparing a pure dry pectin. No. 2,367,132. Herbert Leo, Clarence Taylor and John Lindsey to Mutual Citrus Products Co.

Recovering alkyl phenols from hydrocarbon oils containing them and hydrogen sulfide and simultaneously disposing of waste products. No. 2,367,172. Parker Malson to Shell Development Co.

Production of diacetone keto gulonic acid, comprising heating diacetone sorbose with an alkali metal hypohalogenite in presence of catalyst. No. 2,367,251. John Weijlard and John Ziegler to Merck & Co. Inc.

Hydrogenation of rosin containing an impurity selected from aldehydes, ketones, and organic peroxides. No. 2,367,287. William Kirkpatrick to Hercules Powder Co.

Furfuraldehyde and furfuralcohol containing sufficient acid catalyst to effect polymerization when heated. No. 2,367,312. Edward Reineck to Kewaunee Manufacturing Co.

Producing 1,3-diols which comprises treating a metadioxane with a halogen in presence of aqueous medium. No. 2,367,324. Erving Arundale and Louis Mikeska to Standard Oil Development Co.

Manufacture of aliphatic amine by vapor phase reaction of aliphatic aldehyde with aminating agent chosen from ammonia and aliphatic amines and with hydrogen. No. 2,367,366. John Olin and James McKenna to Sharples Chemicals, Inc.

Manufacture of beta-alanine. No. 2,367,436. Paul Ruggli and Albert Businger to Hoffmann-La Roche Inc.

Reaction product of formaldehyde and an aminocyanoacetamide. No. 2,367,455. Louis Bock and Alva Houk to Rohm & Haas Co.

Utilization of wood acids which consists in mixing tall oil with a neutralizing agent selected from inorganic oxides and hydroxides. No. 2,367,462. Eduard Farber to Polyxor Chemical Co. Inc.

Cyclohexanonyl and alkyl cyclohexanonyl esters of an acid selected from acrylic acid and alpha alkyl acrylic acids. No. 2,367,484. Albert Clifford to Wingfoot Corp.

Manufacture of anhydride of an aliphatic acid having from 2-5 carbon atoms by catalytic oxidation of corresponding aldehyde. No. 2,367,501. David Hull and Claire Marshall to Eastman Kodak Co.

Iminopyrazolones and process of preparing them. No. 2,367,523. Henry Porter and Arnold Weissberger to Eastman Kodak Co.

Production of alkyl derivatives of benzene of high purity from an oil containing benzene and aliphatic hydrocarbons. No. 2,367,535. Frank Sowa.

Beta-cyclohexeneyl alkylamines. No. 2,367,546. Glenn Ullyot to Smith, Kline & French Laboratories.

Simultaneously carbalkoxylating and metallating an organic compound. No. 2,367,632. Vernon Wallingford and August Homeyer to Mallinckrodt Chemical Works.

*Medicinals

Preparing an iodine-containing composition for local application, which comprises subjecting to hydrating action of a separately prepared aqueous dispersion of iodine and a binder, a dehydrated water-soluble inorganic salt which undergoes setting in passing to a higher state of hydration, and which is chemically inert toward iodine. No. 2,365,694. Robert Goodrich, one-half to Roy Steward.

Fumigating an enclosed space infested with lower organisms which comprises introducing into said space carbon suboxide. No. 2,365,979. William ter Horst to United States Rubber Co.

Sulpha-thiazoles. No. 2,366,189. William Hiemenz and Paul Setz to Winthrop Chemical Co. Inc.

Forming a 3-keto-delta 4-unsaturated steroid. No. 2,366,204. Russell Marker and Elmer Lawson to Parke, Davis & Co.

2-(N^4-carboxyacylaminophenylsulfonamido)-4-thiazolones, in which the thiazolone nucleus is substituted at the 5-position. No. 2,366,640. Maurice Moore to Sharp & Dohme, Inc.

2-Carboxyacylaminoarylsulfonamido-4-thiazolones, in which the carboxyacyl group is unsaturated aliphatic. No. 2,366,641. Maurice Moore to Sharp & Dohme, Inc.

Therapeutic agent for diseases caused by microorganisms, comprising a sulfa type compound in admixture with a material to lower toxicity of said sulfa type compound without impairing therapeutic effect, selected from hexuronic acids. No. 2,366,742. Gustav Martin and Marvin Thompson to William R. Warner & Co. Inc.

Production of tropine comprising hydrogenating tropinone, in organic solvent solution, and in presence of Raney nickel. No. 2,366,760. Jacob van de Kamp and Meyer Sletzinger to Merck & Co. Inc.

Sulphonamide derivatives of 4-amino-1,2,4-triazole and processes for their production. No. 2,367,037. Harry Marson to American Cyanamid Co.

Laxative product comprising laxative oil and lacteal material. No. 2,367,166. Clyde Balston.

Solubilizing and stabilizing an anti-hemorrhagic naphthoquinone, which consists in mixing unstable and insoluble 2-methyl-1, 4-naphthoquinone with a nontoxic water-soluble bisulphite salt in water. No. 2,367,302. Marjorie Moore and Frederick Kirchmeyer to Abbott Laboratories.

Anesthetic comprising substance selected from dipyridyl-2-alkylol guani-

* *Continued from Vol. 569, No. 4; Vol. 570, Nos. 1-3*

dines and the salts thereof. No. 2,367,569. Walter Ericks and James Williams to American Cyanamid Co.

*Metals, Alloys

Compressed ferromagnetic core having its magnetic component consisting of synthetically produced ferromagnetic minute particles of magnetic oxide of iron in spherical form. No. 2,365,720. Charles Neighbors to Johnson Laboratories, Inc.

Apparatus for coating both sides of strip of flexible metallic material. No. 2,365,761. Joseph Hunter to Acme Steel Co.

Thermally hardening a steel article having a portion with a higher carbon content than another portion. No. 2,365,956. John Hodge and Max Lightner.

Stainless steel wire in coil form with its surface carrying a compressed film consisting of beeswax, Chinese wax, paraffin, bayberry wax, said film being die-worked into surface of wire under pressure so extremely high that wire is reduced in size by the die-working. No. 2,365,959. Charles Horwedel to The American Steel & Wire Co. of New Jersey.

Preventing corrosion of ferrous metal surfaces when in contact with a mineral oil in presence of water. No. 2,366,074. Jones Wasson and Carroll Wilson to Standard Oil Development Co.

Bonding together sheets of different magnesium-base alloys. No. 2,366,-168. Puzant Bakarian to The Dow Chemical Co.

Treating titaniferous iron ores. No. 2,366,177. Thomas P. Campbell.

Corrosion-resisting thermostatic metal composed of alloy having following composition: manganese, carbon, chromium, silicon, copper, iron, and an alloy having following composition: copper, silicon, manganese fused together. No. 2,366,178. Paul Chace to Metals & Controls Corp.

Bonding together sheets of magnesium or plastically deformable magnesium-base alloys. No. 2,366,185. Harold Diehl and John McDonald to The Dow Chemical Co.

Cold drawing ferrous metals by immersing in bath composed of an oleaginous material, sulphur and water until a heavy black iron sulphide coating has formed, and then removing and subjecting to a drawing operation. No. 2,366,208. Harley Montgomery.

Recovering iron from spent pickling solutions containing iron sulphate and sulphuric acid. No. 2,366,298. Stephen Urban.

Making powdered metal for powder metallurgy which comprises first subdividing a carbon-containing ferrous metal in liquid state, second solidifying subdivided metal and thereafter mechanically disintegrating and decarburizing metal to remove graphitic carbon. No. 2,366,371. Nils Tholand.

Transparent, light transmitting article having surface normally partially light reflective and means for reducing light reflectance of said surface without interfering with light transmission of said article comprising a thin transparent metallic coating on said surface. No. 2,366,687. Harold Osterberg to Spencer Lens Co.

Anodically polishing stainless steel, which comprises making stainless steel the anode in a solution comprising phosphoric acid, CrO_3, and water. No. 2,366,712. Charles Faust to Battelle Memorial Institute.

Anodically polishing article having surface of nickel or of a nonferrous nickel alloy, which comprises making article the anode in a solution containing phosphoric acid, CrO_3, and water. No. 2,366,713. Charles Faust to Battelle Memorial Institute.

Electrolyte for anodic polishing of copper containing ortho phosphoric acid and trivalent aluminum. No. 2,366,714. Charles Faust to Battelle Memorial Institute.

Thermochemically removing metal from a ferrous metal body by applying oxidizing gas stream to a surface of said body while surface is at ignition temperature, to melt and oxidize a portion of body and to form a molten slag containing such removed metal. No. 2,366,787. James Hoffman to The Linde Air Products Co.

Metal identifying system comprising an electrical energy-translating apparatus to serve as source of large current capacity to establish spot weld between piece of metal of unknown composition and sample piece of metal of known composition. No. 2,366,844. Antony Doschek.

Thermoelectric alloy comprising zinc and antimony and tin. No. 2,366,-881. Maria Telkes to Research Corp.

Compound resistance element having as core an alloy of manganese, copper, nickel, said alloy having a negative temperature coefficient of electrical resistance and a sheath of an alloy of silver and manganese having a positive temperature coefficient. No. 2,366,905. Harry Heimberger to Pansye Heimberger.

Dry pelleting magnesium dust, particles of which are coated with carbonaceous or other non-coalescing material, which comprises heating dust to temperature at which particles become plastic, and subjecting plastic material to a gliding pre-compression. No. 2,367,020. Fritz Hansgirg to North Carolina Magnesium Development Corp.

Producing piston rings having electrolytically deposited layer of chromium on their peripheral surfaces. No. 2,367,159. Henderik Van der Horst to Van der Horst Corp. of America.

Electrolytic method of producing printing plates. No. 2,367,236. John Murray.

Recovering cobalt from cobalt-containing material having nickel, iron and copper present. No. 2,367,239. Louis Renzoni to The International Nickel Co. Inc.

Producing metals from their ores which comprises roasting ores while in a finely divided state by downdrafting hot oxidizing gases through them, and thereafter downdrafting reducing gases. No. 2,367,262. Herman Brassert to Minerals & Metals Corp.

Transferring molybdenum from spent molybdenum-activated aluminum oxide catalyst to fresh aluminum oxide catalytic material. No. 2,367,-263. Henry Brown to Standard Oil Co.

Electrolytic method of coating localized areas of articles by forming a copper base alloy into shape desired in completed electrode, electrodepositing layer of nickel on entire surface, immersing quantity of machined bodies in aqueous electrolyte comprising sodium gold cyanide, potassium cyanide and potassium hydroxide. No. 2,367,314. Alexander Russell to Western Electric Co. Inc.

Blowpipe for removing metal from metallic bodies. No. 2,367,316. George Skinner to The Linde Air Products Co.

Rust-resistant metallic composition comprised of a sintered mixture of metal powders consisting of metals of group Cu, Au and Ag, indium, Mn or Ni, balance iron containing eutectoid percentage of carbon. No. 2,367,407. Hermann Kott to Fish-Schurman Corp.

Exothermic reaction mixture for incorporating an alloying element in molten metal consisting of iron, an alloying element, silicon and sodium nitrate. No. 2,367,630. Marvin Udy.

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*Paints, Pigments

Treating pigment-useful substances to improve flat hiding power of aqueous coating compositions containing same which comprises associating with a prime white pigment of a colloidal swelling type bentonite earth containing montmorillonite. No. 2,366,047. Ludwig Nerlinger to E. I. du Pont de Nemours & Co.

Producing a lead silicate green in color which comprises fusing silica and a member selected from lead oxide, lead carbonate and litharge with an oxidizing agent selected from alkali and ammonium chlorates and nitrates. No. 2,366,255. Raymond Hallows and Floyd Barrett to The Eagle-Picher Lead Co.

Making pigments which comprises calcining a mixture containing sulphate of iron and having a creosote-containing material. No. 2,366,-855. Joseph Heckman.

Casein component for water paints which results from dispersing mixture of casein and a soluble alkali in water to form a primary casein solution, and thereafter combining said primary solution with aqueous solution of saponified, water-soluble non-acid derivatives of a cottonseed product and rosin. No. 2,367,108. William H. Fales and William F. Fales.

In manufacture of titanium dioxide by rapid oxidation of a titanium tetrahalide, a method for preventing growth of excessively large crystals on walls of reaction chamber. No. 2,367,118. Josef Heinen.

Converting a phthalocyanine dyestuff to pigment form. No. 2,367,519. Grady O'Neal to The Sherwin-Williams Co.

*Paper and Pulp

Combined grease proof and water repellent paper containing N,N′ diacyl diamino methane, where acyl groups are those of from fatty acids ranging from C_{12} to C_{22}. No. 2,365,813. Earl Gluesenkamp to Monsanto Chemical Co.

Filler for paper consisting of finely comminuted, calcined diatomaceous earth having alkaline reaction, in intermixture with a powdered, solid, acid substance to neutralize alkalinity of said earth. No. 2,366,400. Milo Harrison to The Dicalite Co.

Applying liquid carbon upon a paper sheet. No. 2,366,411. James La Hatte and Robert Smith to The Reynolds & Reynolds Co.

Device for applying a controlled amount of moisture to a moving web of paper by a process involving condensation of required moisture from an unsaturated mixture of steam and air. No. 2,366,484. Donald Bradner to The Champion Paper & Fibre Co.

Finishing paper stock, which includes suddenly reducing temperature of paper promptly after its delivery from a paper machine without altering its moisture content. No. 2,366,563. Van Shaw.

Finishing paper which includes treating paper stock with a liquid size, then exposing both sides of web to radiant heat. No. 2,366,564. Van Shaw.

Producing metallized paper for production of condensers, which comprises applying on one side of paper an insulating coating of a material of dielectric varnish and dielectric lacquer, drying said coating, and metallizing coated paper by depositing a metal coating on insulating coating. No. 2,367,152. Hermann Strab.

Moisture-vapor-proof wrapper having heat sealing qualities which comprises a sheet of glassine paper treated with aqueous solution of anhydrous dextrose and glycerine, coating so treated paper with a melt containing paraffin wax and synthetic rubbery polymerized isobutylene and unmilled thermoplastic rubber derivative. No. 2,367,563. William H. Bryce.

*Petroleum Refinery

Lubricating oil composition. No. 2,365,712. John McNab and Carroll Wilson and Carl Winning to Standard Oil Development Co.

Hydrogenating a hydrocarbon oil containing unsaturated hydrocarbon constituents. No. 2,365,751. Harry Drennan to Phillips Petroleum Co.

Lubricating oil composition comprising lubricating oil and calcium soap of wool olein. No. 2,365,856. Cyril Barton and Thomas Hughes to Shell Development Co.

Interacting isoparaffinic hydrocarbons having less than seven carbon atoms per molecule with olefin hydrocarbons of more than two and less than thirteen carbon atoms per molecule to produce alkylated hydrocarbons boiling within gasoline range. No. 2,365,860. William Bradley and Karl Korpi to Union Oil Co. of California.

Hydrocarbon conversion process wherein heat is periodically stored in a mass of refractory material, reactants to be converted being passed, subsequent to heating of the mass, in contact therewith to abstract heat therefrom and supply heat to reactants. No. 2,365,893. Percy Mather and Lev Mekler to Universal Oil Products Co.

Isomerization of naphthenes. No. 2,365,894. William Mattox to Universal Oil Products Co.

Dehydrogenating hydrocarbons boiling in gasoline range which comprises subjecting to dehydrogenating conditions in presence of a catalyst comprising titanium oxide and molybdenum oxide. No. 2,365,895. Julian Mavity to Universal Oil Products Co.

Solvent extraction process for separating a mixture of different organic compounds comprising contacting with a liquid sulfoxide to produce a raffinate and an extract and separating these. No. 2,365,898. Rupert Morris and Norten Melchior to Shell Development Co.

Separating normal butane and a beta butylene, which comprises subjecting a hydrocarbon mixture containing normal butane and a beta butylene to a fractional distillation in presence of a non-polar solvent selective for beta butylene. No. 2,365,912. Mott Souders, Jr. to Shell Development Co.

Isomerizing saturated hydrocarbons. No. 2,365,917. Charles Thomas to Universal Oil Products Co.

Pour point depressant comprising polymerization product obtained by treating soy bean oil with boron fluoride until produce polymers which are soluble in lubricating oil. No. 2,365,919. Robert Uloth and Martin Mueller-Cunradi.

Producing an improved lubricating oil which comprises adding to a hydrocarbon oil, containing lubricating oil components, an organic compound of trivalent phosphorus. No. 2,365,974. William Schreiber to The Atlantic Refining Co.

Treatment of light petroleum distillate containing undesirable sulfur compounds to eliminate sulfur compounds therefrom comprising contacting distillate with aqueous suspension of cadmium hydroxide. No. 2,-365,993. Frank Apgar to Sinclair Refining Co.

Anhydrous lubricating composition of high load-bearing characteristics

comprising mineral oil admixed with compound containing halogen and sulfur normally corrosive to metals, said compound adapted to increase load-bearing capacity of oil, and a dicyclohexylamine salt of an organic acid selected from high molecular weight fatty acids and petroleum naphthenic acids, to inhibit corrosion of metals by said composition. No. 2,366,013. Gordon Duncan to Standard Oil Development Co.

Selectively plugging formations producing oil and water traversed by borehole to decrease production of water therefrom, which comprises reacting mixture of substances, capable of condensing to form a solid resin, soluble in oil and insoluble in water. No. 2,366,036. Miles Leverett and Gilbert Wrightsman to Standard Oil Development Co.

Lubricant comprising normal hexyl ether and lithium and aluminum stearates, said stearates being present in lubricant to impart a grease consistency to lubricant. No. 2,366,042. John Morgan to Cities Service Oil Co.

Coking heavy residual hydrocarbon oils. No. 2,366,055. Walter Rollman to Standard Oil Development Co.

Coking heavy residual hydrocarbon oils. No. 2,366,057. Francis Russell to Standard Oil Development Co.

Packing material for oil-bearing formation comprising granular material coated with a heavy metal soap of an unsaturated fatty acid. No. 2,366,078. Milton Williams to Standard Oil Development Co.

Regenerating spent aqueous caustic alkali solutions containing solubility promoters for mercaptans. No. 2,366,104. John Happel to Socony-Vacuum Oil Co. Inc.

Conversion of n-butane to isobutane. No. 2,366,117. Ancel Leonard to Phillips Petroleum Co.

Production of cycloolefinic hydrocarbons and aromatic hydrocarbons. No. 2,366,126. Herman Pines and Vladimir Ipatieff to Universal Oil Products Co.

Diesel engine lubricating oil comprising mineral lubricating oil containing an oil-soluble metal sulfonate, and an oil-soluble metal salt of an alkylated diphenol sulfide, and alizarin. No. 2,366,191. Vance Jenkins to Union Oil Co. of California.

Converting hydrocarbons of low value and utility into hydrocarbons of higher value and utility which comprises contacting with a modified vermiculite produced by removing from vermiculite all elements in six-coordination. No. 2,366,217. Robert Ruthruff.

Conversion of a hydrocarbon mixture of wide boiling range into hydrocarbons boiling within usual motor fuel range. No. 2,366,218. Robert Ruthruff.

Transferring catalysts in process of converting hydrocarbons. No. 2,366,372. Vanderveer Voorhees to Standard Oil Co.

Increasing production of a well in which flow of fluid from surrounding strata is impeded, comprising interacting in well a liquid hydrocarbon and liquid chlorine. No. 2,366,373. Vanderveer Voorhees to Standard Oil Co.

Producing a Diesel fuel of high ignition quality. No. 2,366,490. Gould Cloud to Standard Catalytic Co.

Cracking hydrocarbon oils which comprises passing oil to be cracked through a cracking zone containing a catalyst comprising silica and zirconia prepared by first forming a silica hydrosol. No. 2,366,491. Gerald Connolly to Standard Oil Development Co.

Recovering tertiary olefins from alkyl phenols. No. 2,366,497. Oliver Dawson to Standard Oil Development Co.

Lubricating composition comprising a mineral lubricating oil and an oil-soluble copolymer of a styrene and an unsaturated ester. No. 2,366,517. Anthony Gleason to Standard Oil Development Co.

Method of removing coke deposits from high-temperature oil lines. No. 2,366,521. Jules Guichet to Standard Oil Development Co.

Dehydrogenating hydrocarbons which comprises subjecting hydrocarbons to action of a catalyst prepared by forming into shaped bodies a mixture of a refractory material and a metal oxide capable of being reduced to metal with carbon monoxide. No. 2,366,531. Vladimir Ipatieff and Vladimir Haensel to Universal Oil Products Co.

Lubricating composition comprising a hydrocarbon lubricating oil and the combination of an oil-miscible metal salt of a carbocyclic alkylol ether, and an oil-miscible N-aliphatic dithiocarbamate. No. 2,366,539. Rush McCleary and Joseph Fields to The Texas Co.

In sweetening of sour hydrocarbon oils by treatment with doctor solution and elementary sulfur, the method of inducing a break in doctor treatment which comprises adding to system a basic acylated aminoalcohol. No. 2,366,545. Clarence Morris to Petrolite Corp. Ltd.

Hydrocarbon contacted with a regenerative contact mass is periodically regenerated by passing a regenerating fluid therethrough. No. 2,366,567. Irving Shultz to Shell Development Co.

Manufacturing unsaturated hydrocarbons having conjugated double bonds from petroleum oil boiling over relatively wide range. No. 2,366,570. Mott Souders, Jr. and Russell Shiras to Shell Development Co.

Regenerating spent doctor solution containing hydrocarbon oil wherein an oxygen-containing gas is passed through solution at regenerating temperatures. No. 2,366,580. Harry Walker and John Mostyn to The Texas Co.

Asphaltic composition fusible without decomposing, having melting temperature of 700° F. and volatility of less than 5% at said temperature, and being completely soluble in carbon disulfide and soluble in isopentane. No. 2,366,657. Stanley Sorem to Shell Development Co.

Producing lower isoparaffins, which comprises maintaining contact in an unfired conversion zone between aluminum chloride and a paraffinic petroleum oil. No. 2,366,699. Lucien Crockett and Leslie Franklin to Gulf Oil Corp.

Production of branched-chain saturated hydrocarbons. No. 2,366,716. Frederick Frey to Phillips Petroleum Co.

Reacting an alkylatable saturated hydrocarbon with an olefinic hydrocarbon under alkylating conditions in presence of boron trifluoride and fluorosulfonic acid. No. 2,366,731. Vladimir Ipatieff and Carl Linn to Universal Oil Products Co.

Lubricating composition, a wax depressor therefor, and its method of preparation. No. 2,366,735. Eugene Lieber to Standard Oil Development Co.

Reacting an alkylatable saturated hydrocarbon with an olefinic hydrocarbon under alkylating conditions in presence of boron trifluoride and an acid fluoride. No. 2,366,736. Carl Linn and Vladimir Ipatieff to Universal Oil Products Co.

Treating hydrocarbon material containing normally liquid hydrocarbons and unsaturated hydrocarbons. No. 2,366,743. Maryan Matuszak to Phillips Petroleum Co.

Treating crude mineral oil which comprises maintaining mixture of fluid wax and salt-containing mineral oil at above atmospheric temperature, cooling mixture to precipitate solid wax and entrained salt. No. 2,366,792. Chalmer Kirkbride to Pan American Refining Corp.

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Continuous method of cracking hydrocarbon oil. No. 2,366,805. Charles Richker to The Texas Co.

Chlorinating, in presence of metallic magnesium, a vapor phase cracked petroleum product, boiling between 30° and 220° and having a bromine number of 0.4 and then polymerizing the chlorinated material. No. 2,366,813. Tor Smedslund to Johan Bjorksten.

Motor Oil for crank case lubrication comprising a mineral lubricating oil containing phosphatide compound and a stannous soap selected from stannous naphthenate and stannous sulfonate. No. 2,366,817. Charles Towne to The Texas Co.

Mineral oil composition comprising a mineral oil having admixed therewith an oil miscible condensation product of an alkyl substituted aryl metal oxide. No. 2,366,873. Orland Reiff to Socony-Vacuum Oil Co. Inc.

Dehydrating petroleum tar emulsion produced in manufacture of combustible gas wherein petroleum oil is pyrolytically decomposed, said tar emulsion containing water. No. 2,366,899. Edwin Hall and Howard Batchelder to The United Gas Improvement Co.

Dehydration of petroleum tar-water emulsion with separation of constituents of tar into tar residue and hydrocarbon distillate with decreased polymerization of heat polymerizable unsaturated hydrocarbon material contained in said tar. No. 2,366,900. Horace Weir to The United Gas Improvement Co.

Dehydration of petroleum tar emulsion with simultaneous separation of constituents of tar into tar residue and lower boiling constituents with increased separation from said tar residue of heat sensitive unsaturated hydrocarbon material boiling above 200° C. No. 2,366,901. Price Janeway, Jr. to The United Gas Improvement Co.

Reducing corrosiveness of hydrocarbon fluids containing oxygen upon metals which comprises commingling with a reducing gas. No. 2,366,936. Walter Schulze to Phillips Petroleum Co.

Treating natural gas. No. 2,367,081. Alexander Wojciekunas and John Faller, Jr. to Chemical Process Development Corp.

Lubricant comprising oil of lubricating viscosity and open chain organo-arsenic compound containing more than one metallic atom but no metal-to-metal bonds. No. 2,367,133. Bert Lincoln, Gordon Byrkit and Waldo Steiner to Socony-Vacuum Oil Co. Inc.

Continuous process for industrial treatment of olefins, during flow in dry gaseous form through a flue or passage. No. 2,367,169. Daniel Gardner to Gardner Thermal Corp.

Treatment of light petroleum distillate containing undesirable sulphur compounds. No. 2,367,178. Frank Apgar to Sinclair Refining Co.

Beneficiating lubricants, consisting of a normally nonvolatile hydrocarbon product and a substituted aminodiphenylmethane compound. No. 2,367,264. Robert Burk and Everett Hughes to The Standard Oil Co.

Stabilization of unstable distillates, which comprises subjecting distillate to successive vaporization steps in a series of zones of progressively decreasing pressure to produce a vapor fraction in each zone, etc. No. 2,367,284. William Kaplan to Cities Service Oil Co.

Natural gas recycling process. No. 2,367,285. David Brandt to Cities Service Oil Co.

Passing vaporized normal butane through reaction zone containing a stationary mass of aluminum halide isomerization catalyst maintained in presence of hydrogen halide, under conditions such that isomerization occurs. No. 2,367,333. John Callaway and William Skelton to The Texas Co.

Lubricating composition for extreme pressure comprising a lubricating oil and a quinone chloro-imine to impart extreme pressure properties. No. 2,367,344. Elliott Evans to C. C. Wakefield & Co. Ltd.

Production of motor fuel from petroleum oil boiling in range below 420° F., having high octane number and high susceptibility for knock suppressing agents, said oil having sulfur content of less than 0.1% and of a character that would not normally be desulfurized. No. 2,367,348. Paul Harrington to Standard Oil Development Co.

Treating fluid-producing formation penetrated by a borehole, said formation comprising carbonates and silicates, including treating with hydrochloric acid to reduce carbonate content and subsequently introducing hydrofluoric acid and dissolving silicate. No. 2,367,350. John Heigl to Standard Oil Development Co.

Extreme pressure lubricant for use in hypoid gears comprising sulphurized mineral lubricating oil containing active combined sulphur and lard oil, lead naphthenate, and tricresyl phosphate. No. 2,367,355. Gus Kaufman and Samuel Philson to The Texas Co.

Manufacture of low pour test lubricating oil from wax-bearing oil, comprising diluting and chilling wax-bearing oil to separate precipitated wax by filtration in presence of a wax crystal modifier consisting of a sulfurized mono-ester of a fatty acid. No. 2,367,362. Frederic McCoy and Charles Towne to The Texas Co.

Catalytic treatment of naphthas for preparing a finished motor fuel of high octane number. No. 2,367,365. John Munday and Eldon Stahly to Standard Oil Development Co.

Mineral oil composition comprising a mineral oil having admixed therewith an oil-miscible nuclear alkylated amino-aryl hydroxide. No. 2,367,377. Orland Reiff and Howard Hartough to Socony-Vacuum Oil Co. Inc.

Treating oils to remove dissolved normally solid constituents therefrom which are insoluble in liquefied normally gaseous hydrocarbons by diluting oil with large volume of a liquefied normally gaseous hydrocarbon in a vertical treating tower. No. 2,367,385. Robert Weeks and Burton Belden to Standard Oil Development Co.

Liquid lubricant for internal combustion engines comprising petroleum lubricating oil containing dissolved alkaline earth metal soaps of oxidized and nonoxidized sulphonic acids. No. 2,367,435. Paul Ruedrich to Tide Water Associated Oil Co.

Lubricant comprising lubricating oil susceptible to formation of carbon, sludge, or varnish during use and to reduce such formation a product obtained by reacting a hydrocarbon with chlorosulfonic acid and agent selected from sulfurizing agent or phosphorizing agent, and treating with a neutralizing agent. No. 2,367,468. Lawson Mixon and Clarence Loane to Standard Oil Co.

Compounded liquid lubricant comprising liquid hydrocarbon oil subject to deterioration and deposition of adhesive materials, said oil containing amount to reduce said deposition, oil-soluble mixed polyvalent metal salts. No. 2,367,470. George Neely and Frank Kavanagh to Standard Oil Co. of California.

Catalytic hydrocarbon conversion process which catalyst becomes deactivated by carbonaceous deposits and is reactivated and reused in conversion operation. No. 2,367,474. Meredith Stewart to The Texas Co.

Dehydrogenation of aliphatic hydrocarbons. No. 2,367,479. I. Louis Wolk to Phillips Petroleum Co.

Preparing gasoline from crude petroleum oil. No. 2,367,527. Charles Ridgway to The Pure Oil Co.

Manufacture of diolefins from a hydrocarbon naphtha the major portion boils within motor fuel range. No. 2,367,530. Robert Ruthruff.

Geochemical exploration for subterranean petroliferous deposits which

comprises collecting samples of soil at spaced points and determining sulphate content of samples. No. 2,367,592. Eugene McDermott.

Dehydrogenation of butane which comprises treating said butane mixed with propane. No. 2,367,621. Walter Schulze and John Hillyer to Phillips Petroleum Co.

*Photographic Chemical

Production of color photographic images. No. 2,366,324. Alfred Frohlich and Wilhelm Schneider to General Aniline & Film Corp.

Photographic element which comprises support layer, photographic silver halide emulsion layer and layer of a metal alginate which is insoluble in water but soluble in solution selected from ammonia solutions and dilute sodium carbonate solutions. No. 2,366,439. Leonard Chilton and Duncan Woosley to Ilford Ltd.

Concentrated, aqueous, photographic developer, containing developing agent, an alkali metal carbonate and a water-soluble sulfite stabilized by 30 to 60 grams of an alkali metal hydroxide in each liter of solution. No. 2,366,496. George Dawson to E. I. du Pont de Nemours & Co.

Photographic paper which has been water-proofed by melt-coating consisting of a low viscosity cellulose acetate butyrate and a plasticizer, followed by a baryta coating from a composition consisting of blanc fixe, a binder, water and an organic solvent. No. 2,366,723. Hollis Galley to Eastman Kodak Co.

Photographic composition comprising a water permeable organic colloid having distributed therethrough the polymeric reaction product of a ketaldone with dye intermediate containing ketaldone-reactive groups. No. 2,367,036. David McQueen to E. I. du Pont de Nemours & Co.

Obtaining independent color separation photographic records from each of two color-sensitized emulsion layers inseparably superposed on one side of a single support. No. 2,367,335. Harry Edward Coote.

Retarding diffusion of a sensitizing dye from a photographic emulsion, said emulsion having a viscosity low enough that emulsion can be coated on a support to a second photographic emulsion. No. 2,367,508. Edward Knott to Eastman Kodak Co.

Photographic emulsion containing as protective colloid for photo-sensitive element therein a water-soluble hydrolyzed polyvinyl acetate and a water-soluble melamine-formaldehyde hardener. No. 2,367,511. Wesley Lowe and William Fowler, Jr. to Eastman Kodak Co.

Preventing water spots on photographic film during drying, which comprises treating film, after development, fixing, and washing, in a solution of a sulfonated naphthalene. No. 2,367,516. Lowell Muehler, Charles Kunz, and George Eaton to Eastman Kodak Co.

Color-forming photographic emulsion containing dispersed particles of a water-insoluble, water-permeable material having dissolved therein acylamino phenol capable of coupling with development product of primary aromatic amino developing agents to form heat-stable dye. No. 2,367,531. Ilmari Salminen, Paul Vittum and Arnold Weissberger to Eastman Kodak Co.

Hardening and stain prevention process in color photography comprising treating emulsion layer containing dye image with hardening bath free of sulfite comprising a photographic gelatin hardening agent, a buffer compound and an organic acid. No. 2,367,548. Paul Vittum to Eastman Kodak Co.

Improving sensitometric characteristics of a gelatinosilver halide emulsion which comprises adding emulsion of a salt having a cation selected from ammonium, amino and alkali metal, and an anion selected from benzoic acid and its amino, hydroxyl and halogen substitution products, etc. No. 2,367,549. Walter Weyerts to Eastman Kodak Co.

Multi-layer material for making a universal color correcting mask negative to the exposing light. No. 2,367,551. John Yule to Eastman Kodak Co.

*Resins, Plastics

Thermo-setting phenol-formaldehyde resin, a filler and a modified protein substance comprising reaction product of a protein-containing material and the protein content of protein-containing material, of a polyvalent metal hydroxide. No. 2,365,671. Lynn Watt to Monsanto Chemical Co.

Polymer obtained by polymerization of conjugated butadiene with a mononitro alkanol diester of an alpha ethylenically-unsaturated, alpha, beta-dicarboxylic acid. No. 2,365,717. Charles Mighton to E. I. du Pont de Nemours & Co.

Producing a molding compound comprising beating a fibrous filler in water to open up fibers thereof, adding thereto hot material selected from thermosetting synthetic resins which undergo a water phase in their formation. No. 2,365,753. C. Roy Gleason and Robert Small to Sealkote Corp.

Continuously making a flexible, helicoidal structure from a plastic tape. No. 2,365,952. Alden Hanson to The Dow Chemical Co.

Making water-soluble resin comprising heating tetraethylenepentamine with boric acid with elimination of water until a fusible resin is secured. No. 2,366,129. John Rust to Montclair Research Corp.

Producing olefin polymers in which olefin hydrocarbons are absorbed in a liquid acid polymerizing catalyst below polymerizing temperatures and extract thus obtained is heated under pressure to a temperature to polymerize the absorbed olefins in the liquid phase. No. 2,366,171. Arnold Belchetz and Myrle Perkins to The M. W. Kellogg Co.

Polymerizing a vinyl halide in presence of a diacyl peroxide derived from a fatty acid containing between 4 and 10 carbon atoms. No. 2,366,306. Claude Alexander and Harold Tucker to The B. F. Goodrich Co.

Article having hard protective coating of high chemical resistance, good adhesion and wear resistance, comprising mixture of polymethacrylic acid ester and a copolymer of vinylidene chloride and vinyl chloride. No. 2,366,414. Gunnar Lindh to The Udylite Corp.

Making a moldable plastic material from a raw material consisting of a pentosan containing farm product. No. 2,366,425. Ferdinand Ringer.

Hot-molding thermosetting composition comprising a reaction mixture of chrysotile asbestos and orthophosphoric acid. No. 2,366,485. Edwin Brink and Nicholas Arone to General Electric Co.

Composition of a polyvinyl acetal formed from polyvinyl alcohol and an aliphatic aldehyde which contains stabilizer for acetal from cyanamide and dicyandiamide. No. 2,366,492. Fred Cox to Wingfoot Corp.

Synthetic compositions obtained by reaction of a chlorinated acetamide with a benzyl sulphonamide-modified urea resin. No. 2,366,494. Gaetano D'Alelio to General Electric Co.

Molecularly oriented copolymer which exhibits a characteristic crystalline X-ray diffraction pattern, comprising cold-drawn product of polymerization of a mass containing acrylonitrile and itaconic ester. No. 2,366,495. Gaetano D'Alelio to General Electric Co.

Thick cross-section of solid organic plastic, and thin flexible film of glass cemented on a portion of exposed plastic, thereby protecting exposed surface of plastic. No. 2,366,514. Peter Gaylor to Standard Oil Development Co.

Production of ornamental and other effects on plastic material, which comprises subjecting material made of organic acid ester of celllulose to action of an etching bath comprising a sulphuric acid solution. No. 2,366,788. William Horback and Walter Dempsey to Celanese Corp. of America.

Production of synthetic resins. No. 2,367,183. Alva Byrns to Union Oil Co. of California.

Production of insulating materials which comprises polymerizing discrete particles of a low density cellular material selected from cellulose esters and cellulose ethers, with a partially polymerized phenolformaldehyde resin. No. 2,367,275. Clifford Haney and Mervin Martin to Celanese Corp. of America.

Preparing a heat-curable, moldable, extrudable, calendarable, plastic composition. No. 2,367,423. Frederick Myers to The Resinous Products & Chemical Co.

Preparing water-soluble polyamides which comprises condensing hexamethylenediamine adipate with epsilon-aminocaproic-acid-hydrochloride. No. 2,367,469. Paul Moller and Hans-Joachim Nicolai.

Copolymer composed of vinyl chloride and vinylidene chloride stabilized with dicyandiamide. No. 2,367,483. La Verne Cheyney to Wingfoot Corp.

Preparing symmetrical thermoplastic domes, free of surface defects. No. 2,367,642. Edward Helwig to Rohm & Haas Co.

*Rubber

Treatment of carbon-black-containing devulcanized rubber stock which comprises mixing bentonite with the stock and then extracting with rubber solvent while bentonite inhibits removal of carbon black by solvent. No. 2,365,662. Harry Thompson to Wingfoot Corp.

Manufacturing floor covering which comprises uniting rubber layer with a fabric layer by vulcanization, arranging in contact with said fabric layer a layer of felt paper, which is impregnated with an adhesive moistureproofing substance readily liquefiable by heating. No. 2,365,814. Johan Goudsmit.

Obtaining rubber from goldenrod which comprises extracting dry goldenrod plant material with a resin solvent which is a nonsolvent of rubber, mechanically distinegrating treated goldenrod in aqueous medium containing alkali hydroxide. No. 2,365,950. John Haefele and John McGavack to United States Rubber Co.

Antioxidant comprising a rubber and a compound of struction R1-NH-R2 in which R1 is an aromatic radical and R2 is an indan radical attached to nitrogen at 5-position. No. 2,366,018. Carlin Gibbs to The B. F. Goodrich Co.

Rubber heel having a body portion of resilient vulcanized rubber and a wearing portion of abrasion resistant material containing vulcanized rubber. No. 2,366,138. Donald Welch to O'Sullivan Rubber Co. Inc.

Securing a composite deck tread comprising an upper layer of vulcanized polymerized chloroprene having an anti-slip tread impressed thereon and a lower layer of uncured plastic polymerized chloroprene to a metal deck surface. No. 2,366,209. Ross Morris.

Polymerizing aqueous emulsion of a butadiene-1,3 in presence of a dialkyl polysulfide in which each alkyl group is unsymmetrical. No. 2,366,313. George Browning, Jr. to The B. F. Goodrich Co.

Recovering butadiene from a mixture of butadiene and C4-monoolefins. No. 2,366,315. David Craig to The B. F. Goodrich Co.

Increasing plasticity of rubber which comprises milling unvulcanized rubber in presence of salt of a substituted isothiourea. No. 2,366,316. Arnold Davis to American Cyanamid Co.

Invulcanization of rubber with a vulcanizing agent and an accelerator which may cause premature vulcanization of rubber, the improvement which comprises controlling activity of accelerator by resinous material selected from monoterpene-maleic anhydride addition product. No. 2,366,317. Arnold Davis to American Cyanamid Co.

Polymerizing a butadiene-1,3 hydrocarbon in aqueous emulsion containing a free higher fatty acid in concentration in excess of that which is equivalent to concentration of hydroxyl ions present. No. 2,366,325. Charles Fryling to The B. F. Goodrich Co.

Polymerizing aqueous emulsion of butadiene-1,3 in presence of a nitrodiaryl polysulfide. No. 2,366,326. Charles Fryling to The B. F. Goodrich Co.

Polymerizing in aqueous emulsion a butadiene-1,3 hydrocarbon in presence of a dialkyl dixanthogen and of a conjugated enine. No. 2,366,327. Charles Fryling to The B. F. Goodrich Co.

Copolymerizing a butadiene-1,3 hydrocarbon and an aryl olefin in aqueous emulsion in presence of a dixanthogen and a diazoamino aryl compound. No. 2,366,328. Charles Fryling to The B. F. Goodrich Co.

Separating butadiene from mixture of four-carbon hydrocarbons having substantially constant boiling point. No. 2,366,360. Waldo Semon to The B. F. Goodrich Co.

Batch method of purifying butadiene mixed with other hydrocarbons of similar boiling point. No. 2,366,361. Waldo Semon and David Craig to The B. F. Goodrich Co.

Separating butadiene from a mixture of four-carbon hydrocarbons having a substantially constant boiling point. No. 2,366,362. Waldo Semon and David Craig to The B. F. Goodrich Co.

Manufacturing product resembling rubber comprising expressing natural juice from Johnson grass, heating linseed oil, adding glue, sulphur, lamp black, and antimony black. No. 2,366,396. Edward Hallett.

Producing small discrete crumbs of a butadiene polymer from an aqueous dispersion of the said polymer. No. 2,366,460. Waldo Semon to The B. F. Goodrich Co.

Production of isoprene from a 3,3-dimethyl allyl halide, which comprises subjecting anhydrous vapors of said halide to thermal dehydrohalogenation. No. 2,366,620. George Hearne and George Stenmark to Shell Development Co.

Continuous process for alkylation of isobutane by means of normally gaseous olefins in presence of concentrated sulfuric acid. No. 2,366,627. Lebbeus Kemp to The Texas Co.

Composite article comprising rubber and metal and having rubber firmly bonded to metal through a rubber conversion product having same carbon-to-hydrogen ratio as has rubber, less unsaturation than rubber and less plasticity than pale crepe rubber. No. 2,366,895. Thomas Griffith to The Honorary Advisory Council for Scientific and Industrial Research.

* *Continued from Vol. 569, No. 4; Vol. 570, Nos. 1-3*

From Official Gazette—Vol. 570, Nos. 4, 5—Vol. 571, Nos. 1, 2 (Jan. 23-Feb. 13) p. 567

Preparing composite articles wherein rubber is bonded to a metal with relatively great tenacity, which comprises superimposing, on surface of metal, films of rubber conversion products having different hardnesses and having less plasticity than has rubber. No. 2,366,896. Thomas Griffith to The Honorary Advisory Council for Scientific and Industrial Research.

Deproteinizing rubber latex which comprises adding to latex an alkali hydroxide and a stabilizing fatty acid. No. 2,367,120. Johan Hessels.

Catalytic dehydrogenation of normal butenes to produce butadiene. No. 2,367,620. Walter Schulze, John Hillyer and Harry Drennan to Phillips Petroleum Co.

Production of butadiene from normal butane. No. 2,367,622. Walter Schulze, John Hillyer and Harry Drennan to Phillips Petroleum Co.

Production of diolefins of four to five carbon atoms per molecule from corresponding olefins which comprises contacting with a water resistant catalyst consisting of a difficultly reducible metal oxide having incorporated therewith a compound selected from oxides and hydroxides of barium and strontium. No. 2,367,623. Walter Schulze, John Hillyer and Harry Drennan to Phillips Petroleum Co.

*Textiles

Treating fabric comprising synthetic linear polyamide fibers to impart to fabric an improved resilience and a crease resistance which are not destroyed by subsequent laundering. No. 2,365,931. Ernest Benger to E. I. du Pont de Nemours & Co.

Coating machine for applying adhesive in fluid form to web material. No. 2,366,210. John Murch, Ronald Nordquist and Elof Nordstrom to American Can Co.

In process for producing films, filaments, tapes, ribbons, and like from normally solid ethylene polymers the step comprising extruding said polymer in absence of oxygen. No. 2,367,173. Elmore Louis Martin.

Reducing tendency of wool to felt, which comprises treating wool with reagent containing alkaline substance having a stronger basic nature than ammonia, a liquid organic solvent for alkaline substance, and an organic diluent liquid. No. 2,367,273. Archibald Hall and Frederick Wood to Tootal Broadhurst Lee Co. Ltd.

Producing cellulose organic acid ester filaments of circular cross-section which comprises dissolving cellulose acetate butyrate containing acetyl and butyryl in solvent composed of propylene chloride and ethylene chloride. No. 2,367,493. Charles Fordyce and Gerard Clarke to Eastman Kodak Co.

Impregnating an absorbent web. No. 2,367,587. George Knapp to Certain-Teed Products Corp.

*Water Sewage and Sanitation

Treating sewage sludge with a metallic salt selected from ferric chloride, chlorinated copperas, aluminum sulphate, alum, and ferric sulphate. No. 2,365,889. Scott Linsley.

Producing water of reduced salt content from aqueous saline solutions. No. 2,366,184. Reginald Dean to the Government of the United States, as represented by the Secretary of the Interior.

Conditioning water for boiling which comprises incorporating a tetra alkylated quaternary organic compound whose alkyl chains comprise at least 12 carbon atoms. No. 2,366,727. Lewis Gunderson to Dearborn Chemical Co.

Apparatus for treating liquid having a coagulating vessel, means for supplying liquid to be treated and liquid treating reagent to coagulating vessel. No. 2,366,898. William Gurney to The Permutit Co.

System for and method of treating sewage or other waste material. No. 2,366,917. Max Levine to Iowa State College Research Foundation.

Rectifying water to prevent lime deposition therefrom and to dissolve deposited lime, including bypassing water through checkerboard of blocks, each of water soluble solidified lime deposition preventing chemical composition. No. 2,367,228. Marc Lurie.

Septic tank. No. 2,367,270. George Evans and Irwin Gutman.

Selectively removing small immiscible amounts of organic oily impurities from water comprising contacting with inert solid having deposited thereon a cation surface active bonding agent selected from primary, secondary and tertiary organic amines, etc. No. 2,367,384. Sybren Tymstra and Thomas Miles to Shell Development Co.

Treating stick-water which comprises producing increase in specific gravity of water by adding soluble salt selected from sodium chloride and sulphate of ammonia to produce saturated solution, and then removing constituents which float to top. No. 2,367,415. William Martin.

Making shock absorber and hydraulic brake fluids characterized by a viscosity independent of rate of shear and for use in hydraulic equipment, comprising blending with a light refined lubricating oil a heavy isobutylene polymer residue. No. 2,366,794. George Lamb to Standard Oil Co.

Protecting passivated surfaces of a ferrous metal against corrosion by an aqueous ammonium nitrate solution contacted therewith, which comprises making said ferrous metal the anode in an electric circuit. No. 2,366,796. Charles Lawrence and Robert Engle to The Solvay Process Co.

Mixture of oil-miscible metal salts of alkylated hydroxyaromatic sulfide compounds wherein hydroxyl hydrogen atoms of said compounds are substituted with the same metal. No. 2,366,874. Orland Reiff to Socony-Vacuum Oil Co. Inc.

Apparatus for manufacture of granular coated webs comprising means for moving and supporting granular coated web, means to apply a layer of adhesive, etc. No. 2,366,926. Ronnie Melton to The Carborundum Co.

Laminating medium for asphalt impregnated plyboard, comprising an adhesive composition of ungelatinized starch suspended in a gelatinous carrier, and an asphalt in emulsified form. No. 2,366,943. Robert Treadway to A. E. Staley Manufacturing Co.

Continuous process for coating wire with distinctively coloured ribbons of thermoplastic material. No. 2,366,944. Julius Veit.

Spotting a piezoelectric crystal comprising applying spot of bonding compound to side thereof, and heating crystal to fuse said spot. No. 2,366,954. Robert Brooks to Western Electric Co. Inc.

Quick-drying printing ink composition comprising pigment and a vehicle therefor including zein, a water-soluble resin, and a water-soluble glycol. No. 2,366,970. John Kroeger and Harry O'Connor to Frederick H. Levey Co. Inc.

Bulk coal and identifying marking material therefor, said identifying marking material comprising a fluorescent substance and a carrier therefor. No. 2,367,040. Raymond Miskelly to Plymouth Cordage Co.

* *Continued from Vol. 569, No. 4; Vol. 570, Nos. 1-3*

Composite sheet of shellac-bonded mica flakes sanded to uniform thickness and having a thin, smooth surface coating of a methacrylate resin. No. 2,367,047. Fred Pellett to General Electric Co.

Electrographic porous recording medium in sheet form carrying in its pores a mixture of a compound selected from diaminodiphenylmethane, monomethyldiamino-diphenylmethane, etc., an excess of a weak, solid, acid not changed in electrolysis, and an electrolytically inactive hygroscopic agent. No. 2,367,113. Robert Gibney to Bell Telephone Laboratories, Inc.

Froth flotation process for hydrogen bentonite which comprises subjecting pulp of ore to agitation in presence of octyl alcohol and a tri-basic acid selected from tannic and citric acid and their allied alkali-metal salts. No. 2,367,122. Edward Hammond Hoag.

Agricultural Chemicals

Defoliating plants which includes applying a water-soluble fluoride to leaves to cause the leaves to drop off from living plant. No. 2,368,274. Robert Torley to American Cyanamid Co.

Defoliation of plants. No. 2,368,275. Robert Torley to American Cyanamid Co.

Plant defoliation. No. 2,368,276. Robert Torley to American Cyanamid Co.

Defoliating plants which includes applying to leaves a defoliant and a wetting agent. No. 2,368,601. Robert Torley to American Cyanamid Co.

Rendering fluorine containing rock phosphate available as plant food. No. 2,368,649. Kelly Elmore to Tennessee Valley Authority.

Producing starch from wheat grains, treating wheat grains with sulfurous acid to alter properties of nitrogenous substances forming gluten that does not conglomerate into a plastic structure when in contact with water, whereby aqueous suspension of gluten and starch, which will permit separation of starch from gluten by settling may be obtained. No. 2,368,668. Cecil Langford and Richard Slotter to Claude R. Wickard, Secretary of Agriculture of the United States of America.

Forming block of impregnated and compressed wood of constant density throughout. No. 2,368,734. Fred Weick to Engineering & Research Corp.

Precipitating casein from milk which comprises incorporating inert non-condensable gas into milk to produce gaseous-liquid dispersion, adding acid precipitant to precipitate casein and then separating precipitated casein from whey by flotation. No. 2,368,919. Edward Fritzberg to General Mills, Inc.

Producing dry product from leafy portion of legumes from which may be produced a potable beverage. No. 2,369,041. William Graham, Jr. and Clark McCarty to American Dairies, Inc. and The Quaker Oats Co.

Composition for producing a dark colored brew from grasses. No. 2,369,042. William Graham, Jr. and Clark McCarty to American Dairies Inc. and The Quaker Oats Co.

Forming small tender particles of precipitated casein comprising heating skimmed milk to 105° F. and 125° F. mixing milk with solution of 2.5% to 10% of sulfuric acid. No. 2,369,095. Edward Wendt to Hercules Powder Co.

Process of recovering high-boiling unsaponifiable material from rosin and of purifying rosin. No. 2,369,409. John Ross to Colgate-Palmolive-Peet Co.

Cellulose

Treatment of cellulosic pulp to lower the viscosity. No. 2,368,527. Sidney Edelstein.

Aqueous composition capable of converting inflammable cellulosic materials to a non-inflammable condition, which is composed of reaction product of hexamethylenetetramine and oxybenzylalcohol. No. 2,368,660. Frederick Hochstetter to Hochstetter Research Laboratories, Inc.

Manufacture of cellulose mixed esters, reacting cellulose, acetic acid, acetic anhydride, another fatty acid anhydride, a chloro-fluorohydrocarbon and a catalyst. No. 2,368,764. Bayard Lamborn to Hercules Powder Co.

Mixing cellulose of high alpha content with alkali metal hydroxide in water, adding the cellulose of a hypochlorite, and introducing carbon dioxide into mixture to form a cellulose oxychloride. No. 2,369,411. John Roux to Rouxite Co.

Ceramics

Treating aplite in lump form to facilitate reduction to particle size for use in ceramic ware with production of a minimum amount of fines and to facilitate removal of iron. No. 2,368,194. Ralph Brenner to Dominion Minerals, Inc.

Determining degree of anneal or compacting of piece of glass of known composition comprising subjecting said piece of glass and test piece of glass of same composition but of known maximum index of refraction when completely annealed to an annealing cycle. No. 2,369,189, Edgar Tillyer and James Ford to American Optical Co.

Ceramic thread guide body comprising vitrified mixture of titanium oxide and a metallic oxide. No. 2,369,266. Hans Thurnauer to American Lava Corp.

Composition for forming ceramic masses by slip casting procedures, containing titanium dioxide and titanates of divalent metals calcium, strontium, etc., and an alkali metal pyrophosphate having formula between $M_4P_2O_7$ and MeP_4O_{12}, where M represents alkali metal. No. 2,369,327. Eugene Wainer to The Titanium Alloy Manufacturing Co.

Metalizing glass by spraying molten metal alloy upon glass comprising titanium, chromium and copper. No. 2,369,350. Charles Haven to Libbey-Owens-Ford Glass Co.

Electrical insulating tape comprising a fabric backing supporting an adhesive insulating composition consisting of polymerized rosin, a wax-like material, and plasticizing agent for polymerized rosin characterized by high insulating value and good moisture resistance. No. 2,367,663. Joseph Borglin to Hercules Powder Co.

Chemical Specialties

Continuously treating, glyceride drying and semi-drying oils, to improve their drying characteristics. No. 2,367,666. Robert Carleton.

Flex responsive set taking-on composition for applying to surfaces during its internal reaction, said composition including glue, water, sodium nitrate, as an adhesive solution; a homogeneity additional agent of gelatin; a plasticizer factor including glycerin and acetic acid; and a hardening agent of hexamethylenetetramine. No. 2,367,678. Walter Hatch and Jackson Rollins to La Salle National Bank, as trustee.

Homogeneous wax composition comprising paraffin wax, and a syn-

thetic wax formed by reaction of omegahydroxydecanoic acid and an amine selected from octadecylamine, heptadecylamine and hexadecylamine. No. 2,367,712. Theodore Bradley to American Cyanamid Co.

Composition for removing carbonaceous deposits from internal combustion engines comprising methyl naphthalene and cresol, the balance being vehicle having good penetrating and wetting characteristics and selected from refined mineral oils and pine oil. No. 2,367,815. Norman Williams and William Backoff to The Pure Oil Co.

Automatic cleaning apparatus for arcuate cavities in annular molds as such molds are rotated in a plane. No. 2,367,842. Harry Weaver to The Firestone Tire & Rubber Co.

Producing washing and cleaning agent which consists in mixing sodium hydroxide, sodium silicate and borax, adding hydrogen peroxide of 30% and sodium silicate thereto. No. 2,367,971. John Spiegler.

Liquid composition for treating abrasive bodies comprising activated graphite, a cement, a solvent for cement, and sodium hydroxide. No. 2,367,995. Jefferson Buckey to Electronic Products, Inc.

Lubricating composition comprising hydrocarbon lubricating oil having dispersed therein heavy metal salt of reaction product of phosphorous pentasulfide with a mixture of higher branched-chain aliphatic alcohols. No. 2,368,000. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.

Cosmetic astringent composition comprising water-soluble strong acid salt of a polyvalent metal and reaction product of lactic acid and an oxazoline. No. 2,368,075. Herbert Wampner to Commercial Solvents Corp.

Fungicidal composition comprising a carrier and 2,2,4,6,6-pentachloro-4-cyclohexenedione-1,3 as active ingredient. No. 22,597. Elbert Ladd to United States Rubber Co.

Improved lubricating oil composition comprising a mineral lubricating oil having incorporated therein dipiperazyl thiol thiono carbamate to improve viscosity index and pour point. No. 2,368,106. Daniel Bergen to Phillips Petroleum Co.

Manufacture of linoleum or like, wherein adjacent areas of colored substance are pressed by a platen, and in which portions of a continuous lubricant impregnated web is interposed between platen and colored substance to prevent adherence of color to platen. No. 2,368,111. Hammond Burton.

Sealing material comprising blown plasticized paraffin base oil asphalt, vulcanized corn oil, gilsonite, short asbestos fibres and paraffin wax. No. 2,368,118. Harry Denman to Detroit Gasket & Manufacturing Co.

Composition for applying raised markings upon a base material, said composition comprising an extrudable semi-solid gel and particles of tinsel flitter suspended in gel, the gel including a transparent thermoplastic binder and a volatile softening but imperfect solvent medium. No. 2,368,161. Gustave Ruhner.

Insecticidal composition comprising an active toxicant mixture consisting of a crotonamide. No. 2,368,195. Edgar Britton, Gerald Coleman and Wesley Schroeder to The Dow Chemical Co.

Insecticide. No. 2,368,357. Edward Harvill to Boyce Thompson Institute for Plant Research, Inc.

Poison mixture for trap guns that discharge into mouth of animal to be killed, comprising mixture of alkali cyanide and vaseline. No. 2,368,368. Ethel Marlman to The Humane Coyote Getter, Inc.

Continuous process for sweating wax which comprises depositing a film of crude wax on a rotating surface. No. 2,368,468. Fred Hederhorst to Standard Oil Development Co.

Preparing hectograph blanket having stabilized copy surface which comprises coating a backing with a gel forming composition comprising gelatin, a quinone, and a volatile alkali to effect tanning. No. 2,368,516. Robert Bour to Ditto, Inc.

Producing a dispersed hydroxy heavy metal soap in a dehydrated organic vehicle. No. 2,368,560. Arthur Minich.

Obtaining a musk-like material from greasy, oily, odoriferous animal glands, which comprises treating glands in pulverized condition with hydrophobe and then with hydrophile solvents. No. 2,368,578. Charles Sparhawk.

Hectograph blanket comprising a backing, a gelatinous copy mass comprising gelatin and containing a bile salt, and an intermediate bonding layer comprising a drying oil. No. 2,368,583. Robert Tatge to Ditto, Inc.

In treating a mineral lubricating oil with a Friedel-Crafts catalyst wherein hydrocarbon liquid containing a non-settling sludge is produced, the improvement comprising adding a polyethylene polyamine whereby non-settling sludge is precipitated. No. 2,368,596. Fulton Johnston and Norman Wilson to Shell Development Co.

Corrosion inhibiting turbine oil containing a corrosion retarding amount of an alkyl malonic acid. No. 2,368,602. Frederick Weiss to Shell Development Co.

Corrosion-preventive composition comprising a stable neutral vehicle containing finely dispersed a free dicarboxylic acid. No. 2,368,604. Ellis White to Shell Development Co.

Corrosion-preventive composition comprising neutral vehicle containing finely dispersed a halogen-free hydrocarbon monocarboxylic acid alpha or beta hydrosulfide. No. 2,368,605. Ellis White to Shell Development Co.

In production of a foam-generating material, the steps of treating proteinous material with excess of a hydrolysing agent selected from calcium oxide and calcium hydroxide, allowing hydrolysis to take place, and neutralising excess hydrolysing agent with hydrochloric acid. No. 2,368,623. David Tresise and Arthur Ratzer to Pyrene Development Corp.

Fungicidal composition comprising a carrier and 2,2,3,3-tetrachloro-1,2,-3,4-tetrahydronaphthalenedione-1,4. No. 2,368,667. Elbert Ladd to United States Rubber Co.

Lubricant comprising oil of lubricating viscosity and methyl ethylxanthylchlorostearate. No. 2,368,670. Bert Lincoln and Gordon Byrkit to The Lubri-Zol Development Corp.

Insecticide comprising solution of insecticidal rotenone product in a petroleum solvent with a chlorinated phenol, having an unsaturated hydrocarbon substituent. No. 2,368,709. Mortimer Harvey to The Harvel Corp.

Mud laden drilling fluid containing sodium triphosphate. No .2,368,823. Allen Garrison to The Texas Co.

Composition for treatment of coal comprising calcium chloride, chromic oxide, manganese dioxide, potassium acid fluoride. No. 2,369,024. Lawrence Crecelius to The Coal Processing Co.

Operation of electrical transformers containing petroleum oil as dielectric and cooling medium, which comprises insulating and cooling the windings and core of a transformer with a petroleum oil containing dissolved therein alkyl anthranilate. No. 2,369,090. Charles Trautman to Gulf Research & Development Co.

Pest control in culture of sugar beets or like comprising mixture including cotton seed meal base and compound having high releasable chlorine content compacted into dense pellet. No. 2,369,097. Stanley Wilkins to California Pellet Mill Co.

Insecticidal and fungicidal materials. No. 2,369,137. Gerald Coleman and Gerald Griess to The Dow Chemical Co.

Extreme pressure lubricating agent containing chlorine and sulfur, and derived by chlorinating a petroleum hydrocarbon fraction and treating with a sulfurizing agent, to which has been added condensation product of aromatic compound and long aliphatic compound. No. 2,369,149. Eugene Lieber and Aloysius Cashman to Standard Oil Development Co.

Lubricant comprising oil of lubricating viscosity and an organic thiocarbonate. No. 2,369,150. Bert Lincoln and Gordon Byrkit to Continental Oil Co.

Bating composition for treating skins of sheep and calves for production of top grain leather, comprising enzymatic agent composed of whale pancreatin, and a soluble salt of a sulfuric acid ester of a higher molecular fatty alcohol. No. 2,369,256. Friedrich Schmitt to American Hyalsol Corp.

Treatment of soap nigres, comprising separating impurities from soap nigre together with portion of soap of nigre. No. 2,369,372. Leopold Sender to The Sharples Corp.

Drilling mud in form of alkaline thixotropic dispersion comprising clay, water, sodium hexametaphosphate, and buffer salt. No. 2,369,407. William Robinson, Jr. to The Texas Co.

Insecticidal composition for use in aqueous emulsions comprising spray oil, and a depositing and emulsifying agent consisting of a carboxylic acid ester of a polyhydroxy alcohol. No. 2,369,429. Clifford Boissonou to Shell Development Co.

Producing aqueous wax emulsion of synthetic wax which is reaction product of diethylene triamine and stearic acid, and a water-soluble emulsifying agent. No. 2,369,472. Donald Light and Russell Morgan to American Cyanamid Co.

Fuel oil composition containing mineral oil having fuel oil characteristics and normally tending to form a sediment, an oil-soluble metal soap, and compound selected from alkylamines, arylamines and soaps of organic amines, whereby formation of sediment is reduced. No. 2,369,490. Wayne Proell to Standard Oil Co.

Retarding filtration of water from salt water drilling fluid comprising adding gluten to said drilling fluid. No. 2,369,560. George Gray to Standard Oil Development Co.

Hydrocarbon lubricating oil containing as antioxidant and anticorrosive agent having a tendency to form sludge in oil upon continued heating, a dithiophosphate. No. 2,369,632. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.

Coatings

Metal cladding which includes heating, cleansing, and bonding as a continuous operation, two thin strips of metallic sheet material of nonpermeable and permeable character. No. 2,367,715. Everett Chapman.

Protective stop composition for application to surfaces in molten state as a coating comprising acetamide of an aliphatic hydrocarbon of from 12 to 24 carbon atoms and ethyl cellulose, the coating resistant to action of acids, alkalies and many organic chemicals. No. 2,367,954. John Lum and Thomas Keating to Westinghouse Electric & Manufacturing Co.

Cellulose triacetate coating compositions comprising cellulose triacetate having an acetic acid content of 58 to 62% dissolved in solvent mixture comprising non-solvent mixture containing a lower nitroparaffin and a lower aliphatic alcohol, and true solvent for cellulose triacetate selected from tetrachloroethane, etc. No. 2,368,062. Charles Bogin to Commercial Solvents Corp.

Finishing composition comprising product of reaction of shellac with solution in a fatty drying oil of a bivalent metal oxide that is soluble in hot drying oils, a paint oil drier, and a volatile solvent for product of reaction. No. 2,368,126. Jacob Fain to Foster D. Snell, Inc.

Process of terne coating which comprises bringing a cleaned metal body into association with molten terne metal and then in contact with molten anhydrous flux, said flux comprising ammonium bromide and chloride of zinc. No. 2,368,128. Benjamin Finkbone and William Marshall to The American Rolling Mill Co.

In printing upon dried cellulose ester lacquer film with a fast drying ink comprising a volatile solvent, a pigment, and a film forming binder, the steps which comprise inhibiting drying of said ink prior to printing by incorporating in ink a drying retardant selected from dibutyl phthalate, butyl Cellosolve, etc. No. 2,368,157. Frank Ortolano to Rheem Manufacturing Co.

Coating for weldrods for gas welding chromium bearing steels. No. 2,368,280. Evan Wilson and James Obert to The Babcock & Wilcox Co.

Solid metal corrodible by salt solution coated with a corrosion-preventive film formed by a dicarboxylic acid. No. 2,368,606. Ellis White to Shell Development Co.

Structural normally corrodible metal coated with a corrosion-preventive film of a hydrocarbon monocarboxylic acid hydrosulfide. No. 2,368,607. Ellis White to Shell Development Co.

Adhesive composition comprising adhesive film-forming material selected from water-soluble amylaceous and proteinaceous materials and alkali-soluble proteinaceous materials, and, as plasticizer, a polymerized terpene. No. 2,368,767. Malcolm Moore to Hercules Powder Co.

Treating inflammable nitrocellulose dope to render same non-inflammable when dry, which comprises mixing and agitating inflammable nitrocellulose dope and zinc chloride. No. 2,369,200. Linton Amberson.

Preparing paper coating compositions which comprises mixing together protein adhesive selected from casein and soybean, mineral pigment, water, an aldehyde, coating clay, etc. No. 2,369,427. Eugene Bennett to The Champion Paper & Fibre Co.

Forming sheet of paper having resistance to penetration of grease and moisture which comprises forming waxed surface on sheet capable of being wetted and effecting application of a surface coating layer of polyvinyl alcohol to waxed sheet. No. 2,369,450. Harry Fisher and James Thompson to The Gardner-Richardson Co.

Dyes, Stains

Printing color separation image into layer of multilayer photographic material having two light sensitive silver halide emulsion layers. No. 2,367,936. Bela Gaspar to Chromogen, Inc.

Cyanine dyestuff intermediates. No. 2,368,222. John Kendall, Harold

Suggate and Henry Wood to Ilford Ltd.

Dye intermediates comprising bis-acylacetamides and their preparation. No. 2,368,302. Andrew Jennings to E. I. du Pont de Nemours & Co.

Production of dyestuffs which comprises condensing by heating together a quaternary salt of a heterocyclic nitrogen compound of type used in cyanine dyes. No. 2,368,305. John Kendall to Ilford Ltd.

Sulfur dye made by heating a p:p'di (6-methyl-benzthiazyl) azobenzene - di(4-thiocyanosulfonanilide) in non-aqueous organic solvent with sodium sulfide until by hydrolization the corresponding di(4-mercaptosulfonanilide) polysulfide is formed. No. 2,368,657. Norman Haddock to Imperial Chemical Industries Ltd.

Sulfur dye. No. 2,368,658. Norman Haddock to Imperial Chemical Industries Ltd.

Anthraquinone dyestuff fast to acid fading produced by condensing aliphatic aldehyde with substance selected from 4,8-di-hydroxylamino-anthrarufin and 4,8-diamino-anthrarufin, carried out with the anthrarufin compound in leuco form. No. 2,368,681. George Seymour and Victor Salvin to Celanese Corp. of America.

Production of anthraquinone dyestuffs fast to acid fading, which comprises condensing an aliphatic aldehyde with a 4,8-dihydroxylamino-anthrarufin. No. 2,368,682. George Seymour and Burnard Pull to Celanese Corp. of America.

Dyestuffs of stilbene series and process of making same. No. 2,368,844. Ernst Keller and Reinhard Zweidler to J. R. Geigy A. G.

Preventing or retarding fading of dyes on cellulose acetate when such colored materials are subjected to gas fumes, which comprises treating with an N-N'-diarylformamidine. No. 2,369,122. Charles Giles and Donald Wilkinson to Imperial Chemical Industries Ltd.

Color producing composition which comprises an ice color coupling component and a stabilized diazo compound. No. 2,369,308. Paul McClellan and Walter Ericks to American Cyanamid Co.

Color producing composition which comprises an ice color coupling component and reaction product of ice color diazo component of benzene series with compound selected from guanidine, guanylurea and biguanide, etc. No. 2,369,309. Paul McClellan and Walter Ericks to American Cyanamid Co.

Distinguishing colors showing little or no color contrast to eye from a distance but having spectrophotometric curves with steep reflectance increases in different portions of spectrum. No. 2,369,317. William Shurcliff to American Cyanamid Co.

Recovering hematoxylin from aqueous logwood extract. No. 2,369,343. Raymond Drew to American Dyewood Co.

Dyestuffs. No. 2,369,355. John Kendall and John Majer to Ilford Ltd.

Manufacture of azo-dyestuffs, comprising coupling 5:5'-dihydroxy-2:2'-dinaphthylamine-7:7'-disulfonic acid, with a diazotized aminoazo-dyestuff. No. 2,369,516. Walter Anderau to Society of Chemical Industry in Basle.

Dyeing and finishing textile materials, by impregnating material with carbazole hydroxycarboxylic acid arylide, then impregnating with aqueous solution containing urea, formaldehyde, and diazotized 4-amino-1-benzoyl-amine-3-methoxy-6-methylbenzene, and heat-treating for hardening of artificial resin and fixation of dyestuff. No. 2,369,613. Ernst Schubert and Heinz Pierer.

Equipment

Preparing glass stock piece for visual inspection purposes including removing therefrom the surface substances resulting from grinding processes by acid reaction process and wetting said opposed surfaces with wetting agent. No. 2,367,704. Victor Walker, to AlnCin, Inc.

Apparatus for removing moisture from liquid products. No. 2,367,770. Joseph Hall to Drying & Concentrating Co.

Making lined cement-asbestos pipe. No. 2,367,844. Charles Cuno to The Lehon Co.

Ultraviolet transmitting glass, impervious to ultraviolet radiations of wavelengths shorter than about 280 mu containing SiO_2, K_2O, Na_2O, Al_2O_3, and PbO. No. 2,367,871. Harry Kalsing, Hermann Krefft and Kurt Larche to General Electric Co.

Salt bath furnace. No. 2,367,897. Ronald Smith.

Fireproofing grease ducts which periodically conduct flows of grease and moisture laden air, having a film of oil on interior and coating of powdered substance selected from dolomite, calcium hydroxide, magnesium hydroxide, in mixture with talc alum, asbestos. No. 2,367,918. Alex Bartel.

Radiometric titration method of determining end-point of a reaction when solution is subjected to influence of a reagent, at least one of components of reaction being radioactive. No. 2,367,949. Alois Langer to Westinghouse Electric & Manufacturing Co.

Apparatus for separating mixed fluids. No. 2,368,049. Charles Stratford to Stratford Development Corp.

Method and apparatus for dehydrating wet oil, tar and the like. No. 2,368,089. Edward Burrough to Maurice Donovan Curran.

Apparatus for making granular an agglomerative powder of carbon black which is fine and dry. No. 2,368,112. Samuel Carney to Phillips Petroleum Co.

Thermohydrometer including liquid barrel having float element capable of use for testing specific gravity of a plurality of different liquid solutions. No. 2,368,123. Robert Edelmann.

Apparatus for presizing glass tubing. No. 2,368,169. Jesse Smith to MacGregor Instrument Co.

Machine for coating absorbent continuous webs with substance suspended in an oil phase emulsion containing finely divided water as the disperse phase. No. 2,368,176. Arthur Ronald Trist.

Method and apparatus for dispensing liquefied gases. No. 2,368,215. Odd Hansen to The Linde Air Products Co.

Apparatus for recovering solids from main body of a hot gaseous medium. No. 2,368,263. Claude Schneible.

Casing or furnace wall for steam generators or other fluid heat exchange installations. No. 2,368,265. Rolfe Shellenberger and Frank Gilg to The Babcock & Wilcox Co.

Treating a carbon electrode, comprising impregnating it with linseed oil and then curing the oil by heating to convert the oil to a temperature-irreversible gel. No. 2,368,306. Edwin Kiefer and Walter Krellner to Stackpole Carbon Co.

Making foundry cores which comprises mixing foundry sand with sodium sulphonate of isopropyl naphthalene and a substance selected from fluosilicates, fluotitanates, etc., of sodium and potassium and incorporating sodium silicate. No. 2,368,322. Georges Passelecq.

Detecting foreign matter in a light permeable receptacle for liquid containing colloidally dispersed material. No. 2,368,350. Samuel Ellison to Tru-Ade, Inc.

Liquid treating apparatus and process. No. 2,368,354. Walter Green to Infilco Co. Inc.

Method of thermo-dynamic conversion, for engines whose working includes compressing of air for ignition and combustion of non-volatile fuel. No. 2,368,423. Victor Olsen.

Making abrasive tool which comprises applying layer of adhesive to surface of a blank, embedding abrasive particles in adhesive layer, applying metal to enclose particles. No. 2,368,473. George Keeleric.

Pump for pumping fully liquid material. No. 2,368,528. Miles Lowell Edwards.

Pump for handling liquids at temperatures at flashing point of the liquid. No. 2,368,529. Miles Lowell Edwards.

Pump of gas expelling type. No. 2,368,530. Miles Lowell Edwards.

Multiple effect evaporating and distilling apparatus. No. 2,368,588. Eugene Worthen, Fenner Barbour and Stephen Putnam to Buena Vista Iron Co.

Means for ascertaining depth of liquid in a container comprising a float. No. 2,368,589. Daniel Bierman to Petrometer Corp.

Liquid level gauge for measuring liquid level in a tank. No. 2,368,616. Albert Rosenberger to Republic Flow Meters Co.

Vapor generator. No. 2,368,633. John Blizard to Foster Wheeler Corp.

Distillation method and apparatus. No. 2,368,665. Girard Kohman and Charles Prescott, Jr. to Bell Telephone Laboratories, Inc.

Apparatus for indicating and controlling flow of solid materials. No. 2,368,672. Francis McNamara to Houdry Process Corp.

Electrolytic condenser comprising a filmed tantalum electrode, another electrode, and electrolyte comprising an ionized solution of lithium chloride. No. 2,368,688. Raymond Taylor to Bell Telephone Laboratories, Inc.

Nondeteriorating dry battery. No. 2,368,697. Gunnar Winckler to Winckler Engineering Laboratories, Inc.

Indicating level gauge for liquid enclosing tanks. No. 2,368,705. Eleuthere du Pont and Stephen du Pont to Indian Motocycle Co.

Device for dispensing highly volatile fluids. No. 2,368,735. George Cecil White.

Converter for producing carbon black from hydrocarbon gases. No. 2,368,827. Hilding Hanson and Robert Skoog and Lolan Grisso to United Carbon Co. Inc.

Electrolytic cell. No. 2,368,861. Dwight Means to Hooker Electrochemical Co.

Measuring and control instrument in combination with glass furnace having channel and forehearth. No. 2,368,937. Howard McGillin and Joseph Vollrath to The Brown Instrument Co.

Liquid proportioning apparatus. No. 2,368,990. Frank James to Allied Chemical & Dye Corp.

Electric arc furnace comprising at least three electrodes disposed along vertical apical edges of an equilateral triangular prism. No. 2,368,998. Raoul Nissim.

Apparatus for extraction of liquids in form of fine mist entrained in a hydrocarbon stream at pressure of 500 pounds per square inch, said stream being composed of light gaseous hydrocarbons. No. 2,369,020. Joseph Clark to Stanolind Oil & Gas Co.

Hose clamp. No. 22,601. Verner Sprouse.

Filtering apparatus. No. 2,369,124. Gordon Ilan.

Metal insert for sealed highly evacuated devices such as electron tubes having soft glass portion to which insert is to be sealed, said insert consisting of core of an alloy of nickel, iron, chromium and aluminum. No. 2,369,146. Walter Kingston to Sylvania Electric Products, Inc.

Sedimentation tank. No. 2,369,194. William Weber to The Dorr Co.

Device for purifying liquids. No. 2,369,232. Louis Hinton.

Metallurgical apparatus comprising metal holding vessel mounted to turn about horizontal axis, a metal pouring spout, etc. No. 2,369,272. Luther Bahney and Alfred Horswell to Scovill Manufacturing Co.

Froth skimming and crowding device for flotation machines. No. 2,369,401. Norman Morash to American Cyanamid Co.

Apparatus for making film or sheeting from a flowable cellulose derivative solution. No. 2,369,484. Gale Nadeau to Eastman Kodak Co.

Apparatus for hot drawing a filament formation from a molten organic filament forming material. No. 2,369,506. Elmer Weibel to Irvington Varnish & Insulator Co.

Surge preventer for use in a pipe line. No. 2,369,510. Ira White to The Pelton Water Wheel Co.

Logging boreholes by measurement of gamma ray intensity therein at various levels which comprises moving a bomb containing a Geiger-Muller counter along said borehole. No. 2,369,550. Alex Frosch to Standard Oil Development Co.

Extrusion apparatus comprising a casing and a screw rotatable therein for discharging a plastic from one end of said casing and capable of limited axial movement relative to said casing. No. 2,369,553. Reuben Fields to E. I. du Pont de Nemours & Co.

Carbon deposition furnace comprising a coating chamber, etc. No. 2,369,561. Richard Grisdale to Bell Telephone Laboratories, Inc.

Electron camera tube arrangement. No. 2,369,569. Arthur Hulbert to Bell Telephone Laboratories, Inc.

Explosives

Transporting liquid explosive nitric ester. No. 2,368,638. George Bryce and Vernon Williams to Imperial Chemical Industries Ltd.

Explosive comprising mixture of finely powdered basic perchlorate salt of lead, copper or mercury and finely powdered metal of aluminum, calcium or magnesium. No. 2,369,517. William Bagley, Jr. to Development Engineering Co.

Foods

Propagating yeast cells for production of commercial yeast which comprises inoculating with culture yeast, a yeast-nutrient carbohydrate wort. No. 2,367,931. Marcel Celestin-Honore eloffre.

Leavening baked goods containing milk with lactose-fermenting yeast and baker's yeast, said goods containing insufficient sugar other than lactose contained in milk to produce adequate leavening. No. 2,367,994. Harold Browne, dedicated to the free use of the People of the United States.

Treatment of oil or fat containing material for recovery of oil or fat therefrom. No. 2,368,028. Joseph Kernot and Victor Silberstein.

Producing dried yeast product characterized by stability of available glutathione therein, consisting of forming a yeast slurry, adding acid to adjust pH.

Manufacture of gelatin from aqueous solutions which comprises con-

centrating solution, incorporating a buffer salt selected from sodium, potassium and ammonium salts of citric and tartaric acids. No. 2,368,393. Clarence Zeigler to Industrial Patents Corp.

Inhibiting animal and vegetable fats and oils against rancidity comprising incorporating a monoester of a fatty acid containing 12 to 18 carbon atoms per molecule and compound of ascorbic acid series. No. 2,368,435. Percy Wells and Roy Riemenschneider to Claude R. Wickard, Secretary of Agriculture of the United States of America.

Household jelly and jam preparation ingredient including rapid-set pectin, anhydrous dextrose and anhydrous solids content of mixed corn syrup and sterile lemon juice. No. 2,369,059. Herbert Leo, Clarence Taylor and John Lindsey to Mutual Citrus Products Co.

Apparatus for production of crystalline dextrose comprising rotating drum having smooth surfaced wetting section and crystallizing section. No. 2,369,231. Albert Harding to Corn Products Refining Co.

Fine Chemicals

Separation of n-heptane and of methyl cyclohexane from a mixture containing same which comprises fractionating in presence of methanol as an azeotrope-forming agent. No. 2,367,701. James Tooke to Phillips Petroleum Co.

Thienyl amines and method of making them. No. 2,367,702. Gerrit Van Zoeren to The Wm. S. Merrell Co.

Obtaining aromatic amines methylated in the nucleus. No. 2,367,713. Abraham Burawoy to The Calico Printers' Association Ltd.

Crystalline sodium d-pantothenate. No. 2,367,791. Hervey Parke and Elmer Lawson to Parke, Davis & Co.

Allyl and methallyl esters of lactic and alphaacetoxypropionic acids. No. 2,367,798. Chessie Rehberg and Charles Fisher to Claude R. Wickard, Secretary of Agriculture of the United States of America.

Heterocyclic tertiary amines. No. 2,368,006. John Cusic to G. D. Searle & Co.

Organic compounds and their preparation. No. 2,368,067. Kathryn Lynch to American Cyanamid Co.

Ketals of polyhydroxy nitro compounds. No. 2,368,071. Murray Senkus to Commercial Solvents Corp.

Saturated derivatives of dimethyltetrahydropyran. No. 2,368,186. Jacob Wickert and Benjamin Freure to Carbide & Carbon Chemicals Corp.

Polyhydric alcohols of steroids and method of making the same. No. 2,368,199. Adolf Butenandt and Willy Logemann to Schering Corp.

Carboxylic acids of cyclopentanopolyhydrophenanthrene series and process for producing the same. No. 2,368,204. Hans Dannenbaum to Schering Corp.

Crystalline ternary addition compound of three compounds, a polyhydroxy benzene, a member of group consisting of ortho-aminophenol and para-aminophenol, and compound drawn below. No. 2,368,255. Robert Lyon to E. I. du Pont de Nemours & Co.

Producing a gamma-lactone which comprises liquid-phase hydrogenation of a gamma-keto carboxylic acid in presence of a nickel hydrogenation catalyst. No. 2,368,366. Lucas Kyrides and John Craver to Monsanto Chemical Co.

Producing a 4-hydroxydiphenyl. No. 2,368,361. Russell Jenkins to Monsanto Chemical Co.

N.N-di-(2-hydroxyethyl)-trimethylene diamine. No. 2,368,521. Albert Clifford and Joy Lichty to Wingfoot Corp.

Fully acetylated 2-keto-sugar acids. No. 2,368,557. Randolph Major and Elmer Cook to Merck & Co. Inc.

Addition product of nitrobenzene and para-acetylamino-benzene sulphonyl chloride, existing in crystalline state and having melting-point range of 110-125° C. No. 2,369,023. Harold Coward and Lincoln Shafer to Aridye Corp.

Halosteroids and preparation of same. No. 2,369,065. Russell Marker and Harry Crooks, Jr. to Parke, Davis & Co.

Ultraviolet light filter compound, 1-methyl-3-dimethyl-cyclohexanyl-(5) salicylate. No. 2,369,084. Frits Stockelbach to Fries Bros. Inc.

Bis-beta-phthalimido-N-ethyl-mercuri-acetylene. No. 2,369,339. Morris Daskais to Research Corp.

Chloro-acetaldehyde-dioctyl-mercaptal. No. 2,369,612. Erik Schirm.

Industrial Chemicals, Inorganic

Composition for preserving cut orchids consisting of sodium sulfate, aluminum sulfate, hydrazine sulfate, activated carbon, and water. No. 2,367,795. August Meyer.

Producing metallic disulphides, tellurides and selenides having solid lubricant properties from finely divided raw materials. No. 2,367,946. Edwin Kaercher to Westinghouse Electric & Manufacturing Co.

Production of readily filterable slurries of neutral calcium hypochlorite crystals which comprises adding to previously prepared slurry of neutral calcium hypochlorite chlorine and slurry of dibasic calcium hypochlorite. No. 2,368,042. Homer Robson to The Mathieson Alkali Works, Inc.

Production of hydroxylammonium acid sulfate by action of sulfuric acid on a primary nitroalkane. No. 2,368,072. Philip Tryon to Commercial Solvents Corp.

Condensation of chromic chloride. No. 2,368,319. Irving Muskat to Pittsburgh Plate Glass Co.

Producing anhydrous calcium chromate. No. 2,368,481. Evan MacColl to Chromium Mining & Smelting Corp. Ltd.

Increasing adsorbent activity of a magnesium silicate which comprises contacting with hot calcium chloride solution. No. 2,368,510. Charles Winding to Tide Water Associated Oil Co.

Extracting sulphur dioxide from gas by contacting with mixture of the sulphones of butadiene-1.3 and isoprene. No. 2,368,545. George Hooker, Lewis Drake and Stephen Stowe to The Dow Chemical Co.

Preparing zinc calcium arsenate, which consists in taking solid powdered dicalcium arsenate intimately mixed with solid powdered zinc or zinc oxide in excess and heat treating mixture. No. 2,368,565. George Pearce and Alfred Avens.

Production of pure tungstic acid, comprising treating a crude tungstate in aqueous solution with hydrogen sulfide, in presence of alpha-hydroxy mono-basic aliphatic acids or alpha-hydroxy tri-basic aliphatic acids. No. 2,368,580. Gustav Stein and William Moran to Merck & Co. Inc.

Treating spontaneously hydrolyzable titanium sulfate solutions to increase the stability thereof which comprises dissolving in a compound selected from phosphoric acid and salts of phosphoric acid soluble in sulfuric acid solutions. No. 2,368,591. Roy Dahlstrom to National Lead Co.

Removing an acid gas of type normally found in natural gas, petroleum fractions and coke oven gas, from water immiscible fluid. No. 2,368,595. Ava Johnson to Shell Development Co.

Production of hydrogen peroxide. No. 2,368,640. Gerhard Cook to Carbide & Carbon Chemicals Corp.

Producing carbon black from hydrocarbon gas in elongated cylindrical chamber. No. 2,368,828. Hilding Hanson and Robert Skoog to United Carbon Co. Inc.

Producing improved ammonium sulphate product from coke oven gas containing ammonia. No. 2,368,901. William Tiddy to Semet-Solvay Engineering Corp.

Continuously producing zinc oxide from zinc sulphide by flash-fuming with minimized liberation of iron and copper compounds present in zinc sulphide. No. 2,368,922. Raymond Hallows and Frederick Clearman to The Eagle-Picher Lead Co.

Curing pan cast shapes of self-setting magnesium carbonate slurry. No. 2,368,975. August Dinkfeld to Johns-Manville Corp.

Dehydrating and calcining potash alum to obtain a uniform and homogenous product. No. 2,369,037. Gino Gallo.

Silica-magnesia hydrocarbon conversion catalyst consisting of silica in form of silica gel and magnesia in form of calcined magnesite and lanthanum oxide as promoter and stabilizer. No. 2,369,074. Edgar Pitzer to Standard Oil Co.

Reduction of an oxidic silicon-containing material, effecting an exothermic reduction between said material and reducing element to yield a molten mass containing silicon. No. 2,369,112. Pierre Adeline.

Treating bone black stock to secure a highly active bone black product. No. 2,369,139. Victor Deitz to the Secretary of Commerce.

Manufacture of boron trichloride by passing chlorine through heated mixture of boron oxide and carbon, which comprises converting said mixture into porous sintered mass consisting of boron sub-oxides, etc. No. 2,369,212. Hugh Cooper, one-half to Frank Wilson.

Preparing pure boron trichloride which comprises passing chlorine over and through a mixture of boron oxide and carbon. No. 2,369,214. Hugh Cooper, one-half to Frank Wilson.

Preparing mixture of chromium oxide and an inert extender. No. 2,369,261. Chaim Slonim.

Initiating and accelerating hydrolysis of a titanium sulfate solution which comprises admixing with said solution a peptized, negatively-charged TiO_2 sol. No. 2,369,262. Henry Stark to E. I. du Pont de Nemours & Co.

Manufacture of zinc salts by treating aqueous solution of zinc salts containing iron compounds with alkaline material to make solution basic enough to precipitate ferric iron as ferric hydroxide and thereafter adding an anion which is active oxidizing agent to oxidize ferrous iron to ferric iron. No. 2,369,270. Myron Waddell to E. I. du Pont de Nemours & Co.

Producing chlorine from hot gases containing hydrogen chloride which comprises contacting hot gases with dilute phosphoric acid, etc. No. 2,369,301. Friedrich Kerschbaum to Harold Stowell.

Removing lime from ores. No. 2,369,349. George Hatherell to Frank Garbutt.

Preparing a catalyst, consisting of commingling aqueous solution of a salt of a metal selected from iron, cobalt and nickel, with a water-soluble basic salt of molybdenum, adding ammonium hydroxide, precipitating a complex salt of the metals, etc. No. 2,369,432. Iva Byrns to Union Oil Co. of California.

Production of improved composite titanium dioxide pigments containing rutile titanium dioxide. No. 2,369,468. Franklin Kingsbury and Sandford Cole and William Anderson to National Lead Co.

Manufacture of sodium bicarbonate in a very fine state of division. No. 2,369,475. Walter McGeorge and Francis Milner to MacLeans Ltd.

Preparing a catalyst which comprises impregnating active charcoal with anhydrous molten mixture comprising zinc acetate dissolved in molten ammonium acetate. No. 2,369,524. Herbert Berg and Hans Heim.

Cyclical process of concentrating sulphuric acid in which a body of heating steam is maintained in continuous flow in a closed circuit. No. 2,369,573. Mieczyslaw Kalous and Niels Rambush.

Apparatus including fiberizing means for converting molten mineral wool forming material into multiplicity of fibers and unfiberized particles suspended in a gaseous stream. No. 2,369,605. Edward Powell to Johns-Manville Corp.

Industrial Chemicals, Organic

Catalytic conversion and stripping process which comprises introducing charging stock gases or vapors at a low point in a vertical reaction zone. No. 2,367,694. John Snuggs to Standard Oil Co.

Concentrating aqueous solutions of hygroscopic organic substances having boiling points higher than the normal boiling point of water without loss of substance. No. 2,367,695. Joseph Spiselman to Research Corp.

In recovery of phenol from vapor mixture formed by vapor phase oxidation of benzene to phenol at elevated temperatures, the improvement which comprises bringing resultant mixture into contact with benzene to remove phenol therefrom. No. 2,367,731. Wendell Moyer and William Klingelhoefer to The Solvay Process Co.

Bleaching of cellulosic material which comprises subjecting material to be bleached to action of aqueous solution having pH of 3-9 and containing aldehyde and compound selected from alkali metal chlorites and alkaline earth metal chlorites. No. 2,367,771. Clifford Hampel to The Mathieson Alkali Works, Inc.

Apparatus for producing hydrogen and carbon from thermal decomposition of hydrocarbon vapors by a catalyst. No. 2,367,928. Walter Clark to Clarkiron, Inc.

Dimers of 2-methyl-pentadiene and process for preparing same. No. 2,368,068. Glen Morey to Commercial Solvents Corp.

Preparing hydroxy amides. No. 2,368,073. Philip Tryon to Commercial Solvents Corp.

Nitrogenous condensation products obtained by condensing monomeric 1.2-alkylene imines with organic compounds free from carboxylic groups and modified carboxylic groups. No. 2,368,082. Heinrich Ulrich to General Aniline & Film Corp.

Chemical compounds and method of preparing same. No. 2,368,208. Albert Epstein and Morris Katzman to The Emulsol Corp.

Preparing olefins from alkyl halides. No. 2,368,446. Hyym Buc to Standard Oil Development Co.

Separation and purification of green or water-soluble sulphonic acids from acid sludge obtained in treatment of petroleum oils with concentrated sulphuric acid. No. 2,368,452. Oliver Dawson to Standard Oil Development Co.

Converting alkyl sulphonic acids to hydrocarbons. No. 2,368,484. Henry Mottern to Standard Oil Development Co.

Condensing aldehyde with tertiary olefins, tertiary alcohols, tertiary halides

or tertiary unsaturated halides in presence of an aqueous boron fluoride catalyst. No. 2,368,494. Raphael Rosen and Erving Arundale to Standard Oil Development Co.

Halogenating a saturated hydrocarbon selected from open and closed chain hydrocarbons to favor production of dihalide. No. 2,368,495. James Schiller to Standard Oil Development Co.

Hydrocarbon dehydration by distillation. No. 2,368,497. George Shipley, Jr. and William Franklin to Standard Oil Development Co.

Making derivatives of carbamic acids by disrupting a nitrogen to sulphur bond of an organic sulphide and introducing SC=X between nitrogen and sulphur. No. 2,368,515. Edward Blake to Monsanto Chemical Co.

Separating a vaporizable organic mixture of different components selected from components of different degrees of saturation and of polarity, comprising distilling mixture in presence of a sulfolane. No. 2,368,597. Rupert Morris and Alva Snider to Shell Development Co.

Phosphite ester of paraffin-wax-phenol disulfide, No. 2,368,598. Orland Reiff to Socony-Vacuum Oil Co. Inc.

Phosphite ester of paraffin-wax-phenol carboxylic acid disulfide. No. 2,368,599. Orland Reiff to Socony-Vacuum Oil Co. Inc.

Separating vaporizable impurities from a fluid wherein said fluid is contacted in a scrubber with a heat regenerable absorbent solution to produce a fat solution containing said impurities. No. 2,368,600. Ludwig Rosenstein to Shell Development Co.

Alkylating paraffinic hydrocarbons with olefinic hydrocarbons which comprises reacting in presence of aluminum chloride. No. 2,368,653. Alfred Francis to Socony-Vacuum Oil Co. Inc.

Continuous purification or deodorization of glycerides. No. 2,368,669. Alan Porter Lee and Walter King, Jr.

Isomerizing normal paraffin hydrocarbons in vapor phase by action of a solid aluminum halide catalyst in presence of hydrogen halide. No. 2,368,733. Claude Watson to The Texas Co.

Di-carboxylic acid ester of nitro-isobutyl alcohol selected from nitro-isobutyl oxalate and nitro-isobutyl esters. No. 2,368,765. Robert Lawrence to Hercules Powder Co.

Retarding decomposition of peroxide vapors by surface reactions at elevated temperatures which comprises contacting with surfaces coated with member of group consisting of boric acid, boric oxide and difficultly reducible borate compounds which are fusible to smooth surface and free from alkali. No. 2,368,806. Gerhard Cook to Carbide & Carbon Chemicals Corp.

Preparation of sulphonyl guanylureas. No. 2,368,841. Donald Kaiser and Jack Thurston to American Cyanamid Co.

Trialkyl phosphines for diesel fuels. No. 2,368,866. Edwin Nygaard and John McCracken to Socony-Vacuum Oil Co. Inc.

Stannous phenolate of paraffin-wax-substituted aminophenol. No. 2,368,880. Orland Reiff and Howard Hartough to Socony-Vacuum Oil Co. Inc.

Preparation of alkali-metal omega-cyanoguanidodithiocarbonates. No. 2,368,894. Russell Sperry to American Cyanamid Co.

Alkali-metal omega-cyanoguanidodithiocarbonates. No. 2,368,903. Jack Thurston and Donald Kaiser to American Cyanamid Co.

Purification of acetaldol by distillation. No. 2,368,904. Karl Tuerck and Hans Lichtenstein to The Distillers Co. Ltd.

Recovering alkyl phenols from aqueous solution containing alkali metal alkyl phenolates. No. 2,368,931. Leonard Leum and Edwin Birkhimer and James McCullough to The Atlantic Refining Co.

Separating tar acids from crude tar by treating latter directly with caustic to produce an acidic extract. No. 2,369,022. Howard Cooper and Frederick Thatcher.

Separating saturated and unsaturated components of mixed fatty acids which comprises disruptively oxidizing unsaturated acids into saturated acids of lower molecular weight and dibasic acids through scission at doublebonds by treating mixture with a chromic acid oxidizing reagent. No. 2,369,036. J. D. Fitzpatrick and Latimer Myers to Emery Industries, Inc.

Preparation of adiponitrile from a half alkyl ester of adipic acid, which comprises passing a steam of anhydrous ammonia through a liquid half alkyl ester of adipic acid, in presence of a nitrile forming catalyst. No. 2,369,061. Donald Loder and Walter Bruner to E. I. du Pont de Nemours & Co.

Producing pentaerythritol comprising condensing formaldehyde with acetaldehyde in presence of an alkaline earth catalyst. No. 2,369,083. Harold Spurlin to Hercules Powder Co.

Preparation of a dialkyl peroxide selected from dimethyl, diethyl, and dipropyl peroxide. No. 2,369,096. Richard Wiley to E. I. du Pont de Nemours & Co.

Production of liquid and solid hydrocarbons by passing carbon monoxide and hydrogen under superatmospheric pressure over iron-containing mixed catalyst prepared by coprecipitation of catalyst components. No. 2,369,106. Heinrich Heckel and Otto Roelen.

Selectively oxidizing di- and triolefinic components present in admixture with mono olefinic and saturated components in a fatty body selected from mixed acids and glycerides of semi-drying oils, which comprises subjecting fatty body to reagent containing chromic acid. No. 2,369,108. Latimer Myers and Cornelius Sprang to Emery Industries, Inc.

Pelleting crystalline urea to give granules having particle size between 0.131 and 0.0164 inch in diameter. No. 2,369,110. Edward Harford to E. I. du Pont de Nemours & Co.

Preparation of dichlorobutenes by the chlorination of butadiene. No. 2,369,117. Albert Carter to E. I. du Pont de Nemours & Co.

Production of cyclopentanone. No. 2,369,181. Frederick Rust and William Vaughan to Shell Development Co.

Production of acrylic acid and allyl bromide which comprises subjecting vaporous mixture containing propylene and oxygen, to action of hydrogen bromide catalyst to effect controlled catalytic oxidation of the propylene. No. 2,369,182. Frederick Rust and William Vaughan to Shell Development Co.

Continuous production of 3,5-dimethyl phenol. No. 2,369,196. Paul Williams and Seaver Ballard and Theodore Evans to Shell Development Co.

Production of 3,5-dimethyl phenol from isophorone in presence of catalyst comprising gamma alumina. No. 2,369,197. De Loss Winkler and

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Seaver Ballard to Shell Development Co.

Production of beta-diketones which comprises reacting beta-keto carboxylic acid ester containing free alpha-hydrogen atom, with carboxylic acid anhydride. No. 2,369,250. William Reeder and George Lescisin to Carbide & Carbon Chemicals Corp.

Separation of grained soap from saponifying reagent solution, comprising passing mixture into rotor of a centrifugal separator. No. 2,369,257. Ashton Scott to The Sharples Corp.

Preparing stabilized diazo compounds which comprises condensing ice color diazo component of benzene series with compound selected from cyanamide, dicyandiamide, guanidine, etc. No. 2,369,307. Paul McClellan and Walter Ericks to American Cyanamid Co.

Producing carbon disulphide by reaction of gases consisting entirely of olefins and sulphur in presence of a catalyst and an added reaction controlling agent. No. 2,369,377. Carlisle Thacker to The Pure Oil Co.

Liquid heat transfer composition comprising water and pure levo-2,3-butylene glycol. No. 2,369,435. Robert Coghill and Reid Milner to Claude R. Wickard, Secretary of Agriculture of the United States of America.

Product obtained by reacting protein with reaction product of formaldehyde and a salt of sulphamic acid. No. 2,369,439. Martin Cupery to E. I. du Pont de Nemours & Co.

Surface-active agents sulfato derivaties of alph, alpha² hydroxy phosphonic acids. No. 2,369,443. Joseph Dickey and Anthony Loria to Eastman Kodak Co.

Conversion of butanes into high antiknock motor fuel. No. 2,369,444. Edmond d'Ouville and Bernard Evering to Standard Oil Co.

Producing unsaturated chlorinated hydrocarbons. No. 2,369,485. William Nichols to Westvaco Chlorine Products Corp.

Preparing alkali metal hydracrylates which comprises adding ethylene cyanohydrin to aqueous solution of strong base of alkali metal. No. 2,369,491. Bryan Redmon and George Griffin to American Cyanamid Co.

Producing methylated aromatic hydrocarbons which comprises reacting aromatic hydrocarbon with methoxy-containing organic compound in presence of catalyst comprising zinc chloride and alumina. No. 2,369,495. Louis Schmerling and Vladimir Ipatieff to Universal Oil Products Co.

Product obtained by reacting protein and a formaldehyde derivative of a sulphamic acid salt. No. 2,369,503. Joseph Walker to E. I. du Pont de Nemours & Co.

Preparing polymethine compounds comprising reacting a primary aromatic monoamine with a cyclammonium quaternary salt of type used in cyanine dyes containing member selected from N-acyl beta-arylaminovinyl groups, etc. No. 2,369,509. Frank White to Eastman Kodak Co.

Synthetic process for preparing hydrocarbons, particularly gasoline. No. 2,369,548. John Elian.

Separating and concentrating an olefin which comprises contacting mixture of hydrocarbons containing desired olefin with preferential solvent that forms an addition compound with desired olefin. No. 2,369,559. Edwin Gilliland to Jasco, Inc.

Medicinals

Antiseptic preparation comprising as an active germicidal ingredient betaine esters. No. 2,367,878. John Lee to Hoffmann-La Roche, Inc.

Production of riboflavin by butyl alcohol producing bacteria. No. 2,368,074. Milford Walton to Commercial Solvents Corp.

Disubstituted barbituric acid derivative having, physiologically, the property of producing a hypnotic or sedative action. No. 2,368,335. Lewis Walter and Louis Goodson to The Maltbie Chemical Co.

Disubstituted thiobarbituric acid derivatives and salts thereof, and process of producing the same. No. 2,368,336. Lewis Walter and Louis Goodson to The Maltbie Chemical Co.

Substituted barbituric acids and salts thereof. No. 2,368,337. Lewis Walter and Louis Goodson to The Maltbie Chemical Co.

Disubstituted thiobarbituric acid derivative. No. 2,368,338. Lewis Walter and Louis Goodson to The Maltbie Chemical Co.

Refining antitoxins by subjecting an antitoxic body fluid to digestion with a proteolytic enzyme. No. 2,368,464. Tillman Gerlough to E. R. Squibb & Sons.

Composition for making drinkable suspensions of barium sulphate for X-ray diagnosis, comprising barium sulphate, soluble salts of acids contained in seaweed, algae, fuci, kelp and varic, and water. No. 2,368,833. Siegwart Hermann.

Preparing a blood clotting composition which comprises adding to plasma ammonium sulfate. No. 2,369,111. Ivan Parfentjev to Lederle Laboratories, Inc.

Process of making vitamin A. No. 2,369,156. Nicholas Milas to Research Corp.

Synthesis of ethers of vitamin A. No. 2,369,157. Nicholas Milas to Research Corp.

Synthesis of vitamin A. No. 2,369,158. Nicholas Milas to Research Corp.

Vitamin A derivatives and method of making same. No. 2,369,159. Nicholas Milas to Research Corp.

Synthesis of vitamin A. No. 2,369,160. Nicholas Milas to Research Corp.

Synthesis of vitamin A. No. 2,369,161. Nicholas Milas to Research Corp.

Synthesis of vitamin A. No. 2,369,162. Nicholas Milas to Research Corp.

Synthesis of vitamin A. No. 2,369,163. Nicholas Milas to Research Corp.

Synthesis of vitamin A. No. 2,369,164. Nicholas Milas to Research Corp.

Synthesis of vitamin A. No. 2,369,165. Nicholas Milas to Research Corp.

Synthesis of vitamin A. No. 2,369,166. Nicholas Milas to Research Corp.

Synthesis of vitamin A. No. 2,369,167. Nicholas Milas to Research Corp.

Synthesis of vitamin A. No. 2,369,168. Nicholas Milas to Research Corp.

Preparations of scarlet fever toxin for administration by mouth. No. 2,369,218. George Dick and Gladys Dick and Jonathan Wood; said Jonathan Wood to said George Dick and Gladys Dick.

Preparing vaccine for immunizing swine against hog cholera, comprising mixing blood virus obtained from hogs sick with cholera with solution of crystal violet in glycerol. No. 2,369,267. Frank Tilley to Claude R. Wickard, Secretary of Agriculture of the United States of America.

Hypodermic syringe having means for retaining and controlling a vacuum. No. 2,369,304. Everett Marion Lewis.

Freeing anti-anemic principles from impurities associated therewith, both of which are soluble in methyl alcohol. No. 2,369,465. Havard Keil to Armour & Co.

Apparatus for counting blood corpuscles which comprises in combination capillary channel member, etc., a photoelectric responsive device positioned opposite transparent wall section and automatic counting means associated therewith. No. 2,369,577. Jan Kielland.

Analgetically effective substance of constitution 6-methoxy-1-oxo-2-N-piperidyl-1,2,3,4-tetrahydronaphthalene. No. 2,369,611. Georg Scheuing and Bruno Walach.

Metals, Alloys

Removing copper from hydrocarbon oil which has been sweetened by contact with a copper compound which comprises contacting oil with a cation exchange material comprising an oil-insoluble solid organic resinous condensation product. No. 2,367,803. Hans Schindler to The Pure Oil Co.

Pickling ferrous metals, which comprises placing a sulphuric acid pickling solution in tank, providing mercury cathode and insoluble anode, adding ammonium sulphate and electrolyzing solution in presence of ferrous metal being pickled. No. 2,367,811. Stephen Urban.

Making granular material containing copper pyrophosphate. No. 2,367,877. Edwin Layng to The Polymerization Process Corp.

Coating surface with reflecting film of silver which comprises projecting on to surface separately formed aqueous silver nitrate solution and aqueous reducing solution containing hydrazine sulphate, hydrazine nitrate or hydrazine hydrate and as addition agent magnesium sulphate, sodium sulphate, potassium sulphate or ammonium sulphate. No. 2,367,903. Charles Trevail and Kurt Gladney to Hobbs Glass Ltd.

Producing steel sheet with protective surface finishes of different color applied to produce predetermined markings thereon and to secure adequate corrosion resistance. No. 2,367,939. Royal Gregory to Westinghouse Electric & Manufacturing Co.

Flame hardening a ferrous work piece. No. 2,367,969. Stephen Smith to Air Reduction Co. Inc.

Hardening by nitriding of selected portions of surfaces of metal article, which comprises applying coating composed of organic film forming resinous solids in solution in solvent and carrying tin in comminuted form to portions of surface to be kept free of hardening. No. 2,367,978. Walter Troy to Westinghouse Electric & Manufacturing Co.

Extinguishing burning molten magnesium and like which consists in applying to surface of burning metal comminuted material selected from tuffs and volcanic ash, which are rich in alkali aluminum silicate ingredients. No. 2,38,209. Joseph Fahey and Michael Fleisher and William Rubey.

Producing stainless steel powder from stainless steel swing-grinding residues. No. 2,368,282. John Wulff.

Chlorinating an iron chromium bearing material to form and vaporize a mixture of iron and chromium chlorides. No. 2,368,323. Alphonse Pechukas to Pittsburgh Plate Glass Co.

Producing high-quality brasses containing aluminum in addition to copper and zinc contents. No. 2,369,339. Maurice Wood to Chase Brass & Copper Co. Inc.

Concentrating minerals containing quantities of particles of all size ranges up to maximum of material being treated. No. 2,368,416. Grover Holt to Minerals Beneficiation, Inc.

Heat treating a steel casting having following composition: carbon, silicon, manganese, and iron. No. 2,368,418. Russell McCarroll and Gosta Vennerholm to Ford Motor Co.

Making thin cemented carbide structures which comprises mixing metal in finely divided condition with an oil to provide an unctuous paste. No. 2,368,458. Edgar Engle to Carboloy Co. Inc.

Production of iron powders by gaseous reduction of a finely-divided solid compound of iron. No. 2,368,489. Raymond Patterson.

Process of treating ores and electric furnace therefor. No. 2,368,508. Raymond Wile to Wile Service, Inc.

Making contact with copper oxide layer of a copper oxide rectifier element which consists in making the element the cathode in a tin plating solution comprising stannous oxalate, ammonium oxalate, oxalic acid, gelatine. No. 2,368,749. Philip Dowling and Herbert Taylor to The Union Switch & Signal Co.

In production of brass objects by compression of metal powders containing copper and zinc, the improvement which comprises including in the metal powders, phosphorus from 0.1% to 1% of weight of the powder. No. 2,368,943. Raymond Patterson to The New Jersey Zinc Co.

In manufacture of thin gauge, cold rolled, heat treated, high manganese, high carbon, strip steel and like; the step of subjecting such steel strip to action of dilute aqueous solution of nitric acid to remove scale and to render steel austenitic throughout. No. 2,368,955. Carl Weesner and Wallace Leffingwell to Sharon Steel Corp.

Floating silica from a non-metallic ore which comprises conditioning ore pulp with a solution of a condensation product, of higher fatty acids with polyalkylene polyamines. No. 2,368,968. Ludwig Christmann to American Cyanamid Co.

Smelting non-ferrous materials, which comprises introducing into blast furnace a charge including copper, zinc and tin-bearing materials, and smelting to insure complete reduction of otherwise unreduced tin-bearing material to metallic tin. No. 2,369,029. Louis Deitz, Jr. and Walter Jacobson to Nassau Smelting & Refining Co. Inc.

Treating non-ferrous materials which comprises introducing into furnace a charge including fluxing and reducing materials and material containing copper, zinc, and tin and heating to insure reduction to metallic tin of tin oxide. No. 2,369,028. Louis Deitz, Jr. to Nassau Smelting & Refining Co. Inc.

Aluminum base alloy consisting of beryllium, silver, and aluminum and characterized by high tensile strength at elevated temperatures combined with high thermal conductivity. No. 2,369,354. Louis Kempf and Walter Dean to Aluminum Co. of America.

Making steel of extreme hardness and resistance to wear comprising producing mixture of powdered iron containing carbon in form of a metallic carbide. No. 2,369,211. Frances Clark and Robert Dirkes.

Treating molten aluminum and aluminum base alloys to degasify and decarburize same which comprises introducing mixture of gases comprising chlorine and BC13 into bath. No. 2,369,213. Hugh Cooper, one-half to Frank Wilson.

Beneficiating ores by froth flotation in which acidic mineral is floated from a non-acidic mineral by aid of cationic-type promoter. No. 2,369,311. Harry Mead and Ernest Maust to American Cyanamid Co.

From Official Gazette—Vol. 570, Nos. 4, 5, Vol. 571, Nos. 1, 2 (Jan. 23-Feb. 13)—p. 573

Beneficiating mixtures containing components of higher densities and components of lower densities, which comprises subjecting mixture to hydraulic classification. No. 2,369,393. Walter Hamilton to American Cyanamid Co.

Rigid molded friction element comprising powdered metal selected from soft iron, copper, aluminum, and alloys of copper and heat hardened organic binder for said powdered metal. No. 2,369,502. Frederick Walker to Raybestos-Manhattan, Inc.

Brazing two structures which comprises providing one with oxide coating of such thickness that when oxide is reduced a spongy surface with capillary openings is provided, etc. No. 2,369,537. Thomas Crawford to General Electric Co.

Treating for drawing, steel having manufacturer's coating of magnetic iron oxide, consisting of hydrating iron oxide, keeping oxide coating intact while drying, lime coating and drying. No. 2,369,596. John Millen.

In process of producing magnesium from magnesia raw material containing boron as impurity, wherein magnesia is dissolved in hydrochloric acid to form magnesium chloride solution from which solid magnesium chloride is prepared by electrolyzing in fused state, forming magnesium and liberating an anode gas consisting of chlorine, hydrogen chloride and air, the method of treating the anode gas to remove boron impurities. No. 2,369,610. William Schambra and Claire Shigley to The Dow Chemical Co.

Forming adherent tin coating on a cupreous surface, comprising contacting said surface with aqueous acidic solution containing concentrated sulfuric acid, thiourea, and dissolved tin. No. 2,369,620. John Sullivan and Arnold Pavlish to Battelle Development Corp.

Paints, Pigments

Cold water-insoluble, hot water-soluble paint comprising: water solution of gelatin preserved by addition of mercuric chloride; an ammonium soap; strong ammonia water; and desired pigment. No. 2,369,184. Seymour Silver.

New white titanium oxide pigmentary composition obtainable by calcining hydrous titanium oxide and a mixture of soluble alkali metal compound and compound of aluminum. No. 2,369,246. James Peterson to E. I. du Pont de Nemours & Co.

Producing presscakes of vat pigments having an enhanced solids content. No. 2,369,414. Mario Scalera to American Cyanamid Co.

Producing printing plates having image metal portion selected from nickel-cobalt alloy, copper, zinc and brass and level metal portion selected from nickel-magnesium alloy, cobalt, nickel and iron, comprising treating said plate with a "flotation addition" selected from alkali xanthates, sulfoureas and soluble thiocyanates. No. 2,369,567. Fritz Hausleiter.

Paper and Pulp

Separator for removal of impurities from wood pulp. No. 2,367,961. Adolf Henrik Piponius.

Wrapper comprising outer layer having moisture-imperviousness, inner layer composed of a resin coated paper of pre-selected moisture-perviousness, and intermediate adhesive layer binding of an aqueous sugar solution. No. 2,368,140. Cecil Johnson to Reddir, Inc.

Making continuous web paper and paperboard, effecting uniform distribution of fibers which consists in introducing bentonite in colloidal form and adding acidifying substance to react with bentonite to enhance coagulaton. No. 2,368,635. Levis Booth, deceased, by Alice Lippincott Booth, executrix.

Increasing melting point and decreasing iodine value of crude tall oil and eliminating pine and mercaptan odors therefrom. No. 2,369,446. Russell Dressler and Robert Vivian.

Petroleum Refinery

Exploring for subterranean oil deposits by treating sample containing petroleum oil in unweighable quantities and in adsorbed relation to water contained in earth sample, which includes an extraction process using water-insoluble oil solvent. No. 2,367,664. John Campbell and Ralph Fash to Ralph Fash, trustee.

Minimizing variations in operation of a gasoline stabilizing column following changes in composition of feed of unstabilized gasoline. No. 2,367,862. Horace Gormly to Socony-Vacuum Oil Co. Inc.

Improved turbine oil which comprises petroleum lubricating oil containing morpholinomethyl-beta-naphthol to retard rusting. No. 2,368,022. Robert Herlocker and Milton Kleinholz and Franklin Watkins to Sinclair Refining Co.

Improved turbine oil which comprises petroleum lubricating oil containing bis-(piperidinomethyl)-para-tertiary-amylphenol to retard oxidation of oil. No. 2,368,023. Robert Herlocker and Milton Kleinholz and Franklin Watkins to Sinclair Refining Co.

Separation of n-hexane and of methyl cyclopentane from mixture containing same which comprises fractionating in presence of methanol to act as azeotrope-forming agent. No. 2,368,050. James Tooke to Phillips Petroleum Co.

Alkylating isoparaffins with olefins by means of alkylation catalyst of sulfuric acid type in which hydrocarbon phase is freed of C4 and lighter hydrocarbons and remainder fractionated into cut consisting of desired gasoline constituents and another cut of constituents heavier than desired gasoline constituents. No. 2,368,063. Laverne Elliott to Standard Oil Co. of California.

Production of hydrocarbon fraction having a boiling range within motor fuel boiling range from a hydrocarbon charge stock having a boiling range outside of said range and in which is used a solid catalyst which progressively declines in activity with use. No. 2,368,110. Charles Buell to Phillips Petroleum Co.

Removing dye and tetraethyl lead from gasoline consisting in passing gasoline through clay activated with sulphuric acid or hydrochloric acid. No. 2,368,261. Frederick Neef, Jr.

Vapor phase conversion of low-boiling paraffin hydrocarbons in presence of a Friedel-Crafts type metal halide catalyst, in which vaporous conversion effluents containing vaporized metal halide catalyst and also entrained liquid metal halide-hydrocarbon sludge are contacted with sulfuric acid to remove catalyst therefrom. No. 2,368,309. John Latchum, Jr. and John Upham to Phillips Petroleum Co.

Reclaiming waste asphaltic material. No. 2,368,371. Kenneth Minge and Charles Minge.

Proportioning of emulsion treating chemicals. No. 2,368,447. Rudolph Buchan and Paul McGee to Standard Oil Development Co.

Motor fuel comprising gasoline containing high boiling polymers produced in catalytic reforming in presence of hydrogen of a hydrocarbon oil which polymers are characterized by high aromaticity and initial boiling point of 288° F. and A.P.I. gravity not higher than 30.4. No. 2,368,482. Roy Mathiasen to Standard Oil Development Co.

Regeneration of catalyst which has lost activity by use in catalytic reaction, by passing through said catalyst of oxygen-containing gases in same direction as combustion progresses therethrough. No. 2,368,507. Albert Welty, Jr. to Standard Oil Development Co.

Refining an unstable cracked hydrocarbon distillate containing diolefins to produce a stable distillate. No. 2,368,554. George Lorenz to Shell Development Co.

Device for separating impurities from used lubricating oil. No. 2,368,636. Giacomo Bottaro.

System for preparing gaseous fuel under low but constant pressure for use in internal combustion engines. No. 2,368,680. John Riise.

Combination thermal and catalytic cracking of hydrocarbon oils. No. 2,368,704. Lawrence Carlson to Texaco Development Corp.

Producing knocking-proof liquid fuel which comprises mixing hydrocarbons rich in hydrogen, produced by hydrogenating an oxide of carbon, with a coal extract which is free from ashes and less rich in hydrogen, and subjecting mixture to a heat treatment under 60 atmospheres. No. 2,368,939. Friedrich Martin and Heinrich Tramm.

Conversion of hydrocarbon oil which comprises subjecting oil to contact with catalyst composite comprising precipitated silica and precipitated alumina free of alkali metal compounds, and a heat resistant kaolin. No. 2,369,001. Jacob Ahlberg and Charles Thomas to Universal Oil Products Co.

Producing relatively low bromine number motor fuel which comprises subjecting olefinic gasoline, admixed with naphthenic hydrocarbons heavier than gasoline, to olefin saturating treatment in presence of hydrogenating catalyst and cracking catalyst comprising silica and alumina. No. 2,369,009. Herman Bloch and Charles Thomas to Universal Oil Products Co.

Continuous fractional distillation to remove from a mixture an overhead product of constant characteristics. No. 2,369,058. Harold Legatski to Phillips Petroleum Co.

Manufacture of high octane gasoline, which comprises subjecting naphtha of low antiknock value to thermal reforming treatment. No. 2,369,237. Frank Jenny to The M. W. Kellogg Co.

Preparing improved motor fuel for spark ignition engines. No. 2,369,497. Albert Stanly to Shell Development Co.

Continuous cyclic catalytic process for conversion of hydrocarbons by an endothermic reaction. No. 2,369,523. Arnold Belchetz to The M. W. Kellogg Co.

Preparation of sweet high octane gasoline which comprises treating sour gasoline with aqueous sodium plumbite, thence adding sulfur, etc. No. 2,369,554. Herbert Fischer to Standard Oil Development Co.

Treating sour hydrocarbon liquids which comprises passing sour liquid hydrocarbon containing mercaptans and sulfur over calcined contact agent comprising bauxite and lead oxide. No. 2,369,558. George Gilbert to Standard Oil Development Co.

Photographic Chemicals

Photographic stripping film comprising a support having two superposed silver halide emulsion layers separated by a layer of cellulose ester of acyl content from 13 to 19%. No. 2,367,665. John Capstaff, Gale Nadeau and Clemens Starck to Eastman Kodak Co.

Fractionating an oleiferous charging stock. No. 2,367,671. John Dickinson, Oliver Morfit and Leo Van Orden to Standard Oil Co.

Increasing sensitivity of a gelatino-silver halide emulsion layer, which comprises exposing said layer to an actinic light image, treating undeveloped layer with sulphur dioxide gas. No. 2,368,267. Norwood Simmons to Eastman Kodak Co.

Production of photographic materials containing colloid layers wherein a coating composition consisting of an aqueous dispersion of a water-dispersible colloid is applied to a support. No. 2,2,368,287. Leonard Chilton to Ilford Ltd.

Photographic layer adapted to have a coloring substance formed therein comprising a light-sensitive silver halide and a dye-forming substance. No. 2,368,463. Bela Gaspar to Chromogen, Inc.

Light-sensitive photographic multilayer material comprising superimposed colloid layers, one of said layers comprising compound formed with a soluble acid dye substance and a material selected from biguanides. No. 2,368,647. Paul Dreyfuss to Chromogen, Inc.

Method of photography which comprises printing one of two color separation record onto light sensitive layer of photographic element comprising transparent base having light sensitive silver halide layer containing an immobile color former. No. 2,369,171. Otis Murray to E. I du Pont de Nemours & Co.

Producing light-sensitive print-out emulsion, which comprises precipitating light-sensitive silver halide in gelatin to form emulsion having excess of soluble halide, and adding silver halide of thiosalicylic acid. No. 2,369,449. George Fallesen to Eastman Kodak Co.

Reproducing a multicolored original masked by a vectograph mask containing a color correction image of and for the original. No. 2,369,457. Wesley Hanson, Jr. and Ralph Evans to Eastman Kodak Co.

Photographic material having on a support, light-sensitive emulsion of silver salt containing color coupler and auxiliary agent selected from hydrolysed natural resins, esters, ethers, etc. No. 2,369,469. Edward Knott to Eastman Kodak Co.

Color forming photographic developer comprising primary aromatic amino developing agent and a 3-acylamino-5-pyrazolone having its 4-position unsubstituted with an irreplaceable group. No. 2,369,489. Henry Porter and Arnold Weissberger to Eastman Kodak Co.

Resins, Plastics

Process of photopolymerization which comprises irradiating, with light of wavelengths of 1800 to 7000 Angstroms. No. 2,367,660. Courtland Agre to E. I. du Pont de Nemours & Co.

—Additional patents on resins and plastics, rubber, textiles, and water sewage and sanitation from the above volumes will be given next month.

Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those interested in obtaining further information concerning the patents reported below should communicate with the Patent Department, CHEMICAL INDUSTRIES. Photostated copies of Canadian patents are available from the Commissioner of Patents, Ottawa, Canada.

CANADIAN PATENTS

Granted and published December 5, 1944 (Continued)

Moisture-proofing paper of the glassine type by wax coating, and covering wax film with film of vinyl resin deposited from solvent, and baking to form strongly adherent, clear, non-tacky paper coating. No. 424,512. Carbide and Carbon Chemicals Ltd. (Richard W. Quarles, Arthur K. Doolittle)

Stable plastic shortening mix composed of shortening fats and of dry flour of disrupted starch grains. No. 424,525. The Griffith Laboratories Ltd. (Enoch L. Griffith)

Non-caking cleanser containing silica, water-soluble alkali metal phosphate, and calcium silicate as anti-caking ingredient. No. 424,535. Industrial Patents Corp. (J. K. Gunther)

In a two-stage froth flotation method of beneficiating magnesite ore, the use of methyl amyl alcohol as sole collector in first stage. No. 424,543. Northwest Magnesite Co. (Arthur W. Fahrenwald)

Plastic molding composition composed of silica, sulphur and asphalt. No. 424,586. John M. Wallace (Elvin Merrill Bright)

Granted and Published December 26, 1944.

Means for mounting instruments in frangible casings comprising specially designed mounting elements and bearing surfaces. No. 424,595. Rifat Avigdor.

Method of constructing leakproof cylindrical bodies of concrete combined with cylindrical sheet metal diaphragms held under compression. No. 424,596. John M. Crom.

In a process of passing carbon monoxide and vapour of lower aliphatic alcohol through a reaction zone in presence of phosphoric acid catalyst, and condensing reaction products, the step of introducing a basic nitrogen compound selected from group consisting of ammonia, ethylamine, diethylamine, and aniline, into the reactants issuing from the reaction zone. No. 424,599. Henry Dreyfus.

Method and apparatus for making an unwoven and composite fabric by web retention of liquid-dispersed fibres. No. 424,612. Fred W. Manning.

A process and means for disintegrating and extracting oil from bituminous sand deposits by application at depth through a drill hole of high pressure, high temperature water to hydraulically separate the oil from its cohesive sand underground. No. 424,620. John Herbert Stewart.

Process of deseaming blooms, billets, sheet bars and the like made of nickel and nickel alloys by direct current carbon arc treatment to yield product free from seams, cracks, and such surface defects. No. 424,625. The International Nickel Company of Canada Ltd. (Herman Morissey Brown)

Arrangement for the sparkless interruption of multiphase alternating current comprising a periodically actuated switch in each phase, a rectifier in parallel to the switch, and an auxiliary source of alternating voltage in series with the rectifier. No. 424,627. Aktiengesellschaft Brown, Boveri & Cie. (Julius Jonas)

Spool for photographic film comprising, in combination, an inner extensible core, an outer inextensible core surrounding center core, and flanges carried by the inner core. No. 424,644. Canadian Kodak Co. Ltd. (Joseph Mihalyi)

Method of producing photographic element comprising paper support and photographically sensitive layer, which embodies first forming on a smooth, thin, waterproof layer a uniform, thick photographic layer and then applying the waterproof layer with the unexposed layer to a paper sheet. No. 424,645. Canadian Kodak Co. Ltd. (Henry C. Staehle)

Toilet preparations for dermal applications, including cosmetic cream, skin lotion, and hair dressing, containing as an essential ingredient a polyoxyalkylene glycol of the 1,2 series, containing not more than 3 carbon atoms in each oxyalkylene radical, and said polyoxyalkylene glycol having molecular weight not less than 400. No. 424,649. Carbide and Carbon Chemicals Ltd. (Benjamin G. Wilkes, Helen E. Wassell)

Blanket-forming compound for molten zinc baths which comprises potassium chloride about 35 per cent; ammonium chloride about 4.6 per cent; zinc oxide about 1.1 per cent; and zinc chloride, about 59.3 per cent. No. 424,661. Dewey and Almy Chemical Co. (Dunbar Lancaster Shanklin)

Apparatus for producing metallic magnesium by ferrosilicon thermal reduction, comprising a furnace having a chamber maintained at about 1175 Cent., plurality of metal retorts of 12 inch maximum internal diameter, with major portion located in reducing zone and minor portion without the furnace to provide condensing zones, and means for providing reduced pressure within the hot retorts. No. 424,662. Dominion Magnesium Ltd. assignee of the Honorary Advisory Council for Scientific and Industrial Research. (Lloyd Montgomery Pidgeon)

Apparatus for the recovery of volatized and condensed magnesium, comprising a heating furnace, metal retort having reducing portion within the furnace, and condensing portion outside furnace, and removable condenser arranged within the condensing zone having a tapered inner wall to receive magnesium condensed thereon. No. 424,663. Dominion Magnesium Ltd., assignee of the Honorary Advisory Council for Scientific and Industrial Research (Lloyd Montgomery Pidgeon)

Method and apparatus for extracting volatizable metals from materials containing them which comprises passing such materials by gravity through an elongated, zig-zag reaction zone, heating by radiation only to vaporize the metal therein. No. 424,664. Dominion Magnesium Ltd., assignee of the Honorary Advisory Council for Scientific and Industrial Research (Lloyd Montgomery Pidgeon)

Production of dense, ductile, metallic magnesium by admixture of calcined dolomite and ferrosilicon, briquetting mixture, and vacuum distilling reduced magnesium. No. 424,665. Dominion Magnesium Ltd., assignee of the Honorary Advisory Council for Scientific and Industrial Research (Lloyd Montgomery Pidgeon)

Insecticide, fungicide, and germicide preparation containing as an active constituent, an alpha-aroyl beta-amino-ethane compound; e.g.: alpha-benzoyl-beta-piperidino ethane or alpha-chlorobenzoyl beta-piperidino ethane. No. 424,668. Dominion Rubber Co. Ltd. (William Peter ter Horst)

Preparation of full-flavoured, dehydrated, stable, butter by melting, and vacuum drying at not over 70° Centigrade, to less than 5 per cent water content. No. 424,676. General Mills Inc. (Jakob L. Jakobsen)

In process for the manufacture of 2-methyl-4-amino-pyrimidine-5-carboxylic acid ester the step of reacting thioacetamide with an alkali metal salt of amino methylene cyano acetic ester in an alkaline medium. No. 424,682. Hoffmann-La Roche Ltd. (Heinz Moritz Wuest, Max Hoffer)

Method of freeing zinc sulphide concentrates of a fluorine content not in excess of 1.25 per cent present as calcium fluoride, by elevated temperature treatment of the concentrate with excess sulphuric acid in presence of aluminum oxide, and separation of fluorine in water soluble form. No. 424,694. Mahoning Mining Company (Carl O. Anderson, Rudolph J. Stengyl, Frederick C. Abbott)

Fluorine-purification of fluorspar-bearing zinc sulphide having a calcium fluoride content of approximately 1 per cent, involving treating with 100 pounds of sulphuric, 8 to 10 pounds of boric acid, per ton of dry sulphide, maintaining at 50 to 90 Cent. for one to four hours, and water removal of soluble fluorides. No. 424,695. Mahoning Mining Company (Carl O. Anderson, Rudolph J. Stengyl, Frederick C. Abbott)

Preparation of halogenated cresol by mixing aluminum powder with o-cresol in carbon tetrachloride, adding bromine, adding iron powder, and continuing addition of bromine until sufficient bromine to form tetrabrom-o-cresol has been taken up. No. 424,699. Merck and Co. Inc. (Cyril Stanton Treacy)

Production of isoparaffins boiling in the gasoline range from isobutane and propylene by aluminum chloride treatment, removing paraffin from polymerization products, hydrogenating fraction boiling below 160 Cent., suspending aluminum chloride in above 160 Cent. portion and contacting with isoparaffin under alkylating conditions, and admixing preseparated paraffin with said alkylation and hydrogenation products. No. 424,721. Shell Development Co. (Adrianus Johannes van Peski)

Deodorizing device employing light bulb as source of heat for vaporization and circulation of deodorant. No. 424,736. Stanley Home Products (Nicholas A. Glaskowsky)

Dry refractory composition, containing a major portion of zircon, and 2 to 7 per cent, based on the zircon content, of monoaniline di-acid orthophosphate. No. 424,737. The Titanium Alloy Manufacturing Co. (Eugene Wainer)

Oil reclaimer design. No. 424,746. Universal Oil Reclaimer Co. (Arno A. Braun)

In the manufacture of coated paper with water resistant but wettable surface, the improvement which comprises applying to the paper, in an aqueous medium, a coating pigment, starch adhesive, and an emulsion of a water resistant agent stabilized with a volatile base, dehydrating the applied film and breaking the emulsion by liberating the volatile base during dehydration. No. 424,747. R. T. Vanderbilt Co. Inc. (William Craig)

Manufacture of edible milk-like product by heating milk whey to about 200° Fahr. to coagulate soluble protein content into insoluble precipitate, separating said precipitate and 12 to 15 per cent of the whey, and homogenizing precipitate and aforementioned whey portion to form milk-like product. No. 424,767. The West of Scotland Agricultural College. (Daniel Murray Smillie, John Wight)

Granted and Published January 2, 1945.

Pump, for food and other material in the form of liquid containing solids. No. 424,782. David William Bingham.

Process for the recovery of iron and manganese from open hearth slag. No. 424,784. Patrick Edgar Cavanagh.

Multiple break gas blast high voltage circuit breaker design. No. 424,803. Aktiengesellschaft Brown, Boveri & Cie. (Hans Thommen)

Method of forming smooth, glass-like, tough and blister-free non-warping articles of from plasticized cellulose acetate. No. 424,815. Canadian Celanese Ltd. (assignee of Celluloid Corporation, assignee of Bjorn Andersen, Raymond F. Strasdin)

Moulded article comprising ethyl cellulose having an ethoxyl content of 44 to 46 per cent, and having viscosity of from 20 to 37.5 times the number by which the ethoxyl content is less than 48, the surface of the article being free from a tendency of laminate under friction. No. 424,820. Carbide and Carbon Chemicals Ltd., assignee of Bakelite Corp. of Canada Ltd. (Arthur P. Mazzucchelli)

Composition resistant to heat discoloration comprising artificial thermoplastic resin, including a vinyl halide polymerized therein, combined with a small amount of basic metal chelate derivative of a 13-dicarboxylic compound capable of ketoenol tautomerism. No. 424,821. Carbide and Carbon Chemicals Ltd. (William M. Quattlebaum)

Printing composition for textile fabrics adapted to be applied by ordinary printing techniques. No. 424,834. Interchemical Corporation. (Henry Jenett)

Apparatus for applying liquid to strip material. No. 424,836. International Latex Processes Ltd. (Raymond Benson Frost)

Mounting tissue for photographs and printed matter comprising base sheet carrying uniformly distributed hot-melt composition on both surfaces composed of: 15 to 50 per cent ethyl cellulose; 15 to 50 per cent plasticizer; 20 to 60 per cent hydrogenated castor oil. No. 424,845. Marathon Paper Mills Company (Allen, Abrams, Geo. W. Forcey)

Production of potable water from saline water containing magnesium and sodium chlorides by treatment with silver oxide and silver carbonate and neutralization of hydroxide so formed with weak organic acid. No. 424,868. Sunshine Mining Company (Alexander Goetz)

Discharge tube design wherein leads are sealed in with high melting material. No. 424,879. C. Lorenz Aktiengesellschaft (Annemarie Katsch)

Electron tube design wherein a non-heated screening protects the cathodes from being influenced by the fields of the neutralization system. No. 424,880. C. Lorenz Aktiengesellschaft (Felix Herriger)

Granted and Published January 9, 1945.

Die for regulating the thickness of a viscous coating applied to wire. No. 424,884. Eric Lawrence Wildy, Alexander John Sands.

Process for production of laminated material by mixing alkali treated castor pomace with sawdust or other fillers, drying, and pressing into panels. No. 424,885. Freidrich Bender.

Production of solidified fuel from hydrocarbon distillate by the employment of water-soluble alkali metal petroleum sulphonates and sodium hydroxide. No. 424,914. The Atlantic Refining Co. (William K. Griesinger)

Acid-curing, thermosetting melamine-formaldehyde resin composition. No. 424,921. Canadian General Electric Co. Ltd. (G. F. D'Alelio, James W. Underwood)

Resinous reaction product of urea, formaldehyde, and alpha-(diamino-*s*-triazyl thio acetamido) beta (chloroacetamido) ethane. No. 424,922. Canadian General Electric Co. Ltd. (G. F. D'Alelio)

Smooth ink for glass marking containing lampblack, titanium oxide, silver oxide, and glycerine in quantities of 50 gms.; 10 gms.; 3 gms.; and 150 c.c. No. 424,925. Canadian Westinghouse Co. Ltd. (John C. Wilson)

Heat cast refractory composition containing zirconia, magnesia, alumina, and silica. No. 424,928. Corhart Refractories Ltd. (Theodore E. Field)

Heat cast refractory consisting essentially of crystalline zirconia and corundum in a siliceous non-crystalline matrix. No. 424,929. Corhart Refractories Co. (Theodore E. Field)

A refractory body composed of electrocast grains of silica, alkali, alumina, formed basically into mullite and corundum crystals. No. 424,930. Corning Glass Works (Gordon Scott Fulcher)

Sole leather substitute and method of manufacture thereof composed of open mesh fabric impregnated with plasticized resin. No. 424,938. The Honorary Advisory Council for Scientific and Industrial Research (Wilfred Gallay)

Extraction of oil from oil-bearing sands by block exploding mass of natural sand to loosen the same and rupture the oil film enveloping the grains, to facilitate forming an aqueous pulp of the oil-sand. No. 424,993. Abasand Oils Ltd. (Max Waite Ball)

Compactly compounded fibrous substance composed of fibre, 40 per cent; graphite, 40 per cent; soap, 6 per cent; resin, 10 per cent. No. 425,002. Hermann G. Seybold.

Method of producing surfaces of high heat radiation and low secondary emission by selecting zirconium, tungsten, molybdenum, boron, or silicon carbide, emulsifying the carbide with water and alcohol, spraying emulsion on a supporting layer, and coating with a protective layer of collodion. No. 425,003. C. Lorenz-Aktienegesellschaft. (Erwin Strohfeldt)

Granted and Published January 16, 1945.

Sterilization method by means of emission of band spectrum type having intensity maximum within the wave length 2400-2500 A produced by mercury atmosphere electric discharge. No. 425,016. Ake Oscar U: son Gronvall.

Electromechanical infinitely variable speed gear design. No. 425,022. Heinrich Fritz Liebrecht.

Feed device for greasy or viscous materials. No. 425,030. William Douglas Wise Richman.

Annular packing device for fluid pressure apparatus. No. 425,036. Peter Warborn Thornhill.

Leather tanning and bleaching agent composed of reaction product of an alkyl phenol sulphonic acid having at least one reactive ortho or para position in the nucleus, formaldehyde, and secondary aliphatic amine. No. 425,045. American Cyanamid Co. (Malcolm J. Reider)

Process of preparing leather by impregnating untanned skins with aqueous dispersion of a methylol melamine. No. 425,046. American Cyanamid Co. (Wm. O. Dawson)

Preparation of leather by impregnating untanned skins with aqueous dispersion of a methylol melamine and then applying water-soluble tanning metal salt solution. No. 425,047. American Cyanamid Co. (Wm. O. Dawson)

A diamino a-triazinyl chloro carbophenoxy-ethyl sulphide. No. 425,058. Canadian General Electric Co. Ltd. (G. F. D'Alelio, Jas. W. Underwood)

Resinous reaction product of urea, formaldehyde, and alpha, beta-bis-(diamino s triazinyl hydrazinocarbonyl) ethane. No. 425,059. Canadian General Electric Co. Ltd. (G. F. D'Alelio, Jas. W. Underwood)

Production of weather-resistant, non-warping, asbestos cement building boards, by application of alkaline silicate suspension of zinc oxide, calcium carbonate, or magnesium carbonate, as a protective coating. No. 425,063. Canadian Gypsum Co. Ltd. (Clyde C. Schuetz)

Vinyl chloride-vinyl acetate copolymer having high tensile strength, toughness, flexibility, resiliency, and dielectric strength, over a wide range of temperatures. No. 425,084. Carbide and Carbon Chemicals Ltd. (Stuart D. Douglas)

Wood stain composition containing staining dye dispersed in vehicle-solvent of following parts by weight composition; ethylene glycol, 6; toluene, 5; methanol, 84; acetoacetanilide, 2 to 3. No. 425,085. Carbide and Carbon Chemicals Ltd. (Henry G. Goodman)

Dye solvent-vehicle for dyestuffs normally insoluble in volatile hydrocarbons, composed, in parts by weight, of; ethylene glycol, 6; toluene, 5; methanol, 616. to 84; acetoacetanilide-monoethanolamine condensation product, 2 to 3. No. 425,085. Carbide and Carbon Chemicals Ltd. (Henry G. Goodman, Jr.)

Non-tacky, high tensile strength, flexible, resilient, oil and water resistant vinyl chloride-acetate, plasticized composition. No. 425,087. Carbide and Carbon Chemicals Ltd. (James P. Ferrer, Stuart D. Douglas)

Strong, resilient, and flexible injection-moulded vinyl chloride-acetate copolymer articles. No. 425,088. Carbide and Carbon Chemicals Ltd. (William R. Wheeler)

Steam-conditioning apparatus for tempering leather soles. No. 425,091. B. B. Chemical Co. of Canada Ltd. (Adoniram Judson Wells)

Process for the manufacture of acid esters of alkylated, 1,4-naphthohydroquinones, by reacting said hydroquinones with anhydrides of dibasic organic acids. No. 425,100. Hoffmann-La Roche Ltd. (Walter Karrer)

Process improvements in the manufacture of the cyanhydrin of formisobutyraldol. No. 425,101. Hoffmann-La Roche Ltd. (Kurt Warnat)

Water-soluble phenolic resin adhesive adapted for making boil resistant hot press plywood. No. 425,108. I. F. Laucks Ltd. (Clarence F. Van Epps)

Electron multiplier apparatus design. No. 425,120. Radio Electronics Ltd. (Joseph Gerard va der Bosch)

Device for the production of a foam mass from a fibrous material suspended in water. No. 425,131. Svenska Cellulosa Aktiebolaget (Ernst Isidor Orrmell)

Separation of free carbon from carbides cyanonitrides, and carboxides of titanium and zirconium by soap solution agitation and decantation. No. 425,132. The Titanium Alloy Manufacturing Co. (Chas. C. Laughlin)

Improvement in the electrical digestion of wood for pulp making. No. 425,144. Samuel Hird Milne, John Innes Melvin.

Rustproofing metals by subjecting articles to simultaneous action of molten alkali nitrate, alkali metal hydroxide, and manganese dioxide. No. 425,145. Rust Proofing Co. of Canada Ltd. (Cecil J. MacKay)

Granted and Published January 23, 1945

Ether vaporizing apparatus design. No. 425,148. Harold Sparling Angrove.

Machine for use in assembling laminated belting connected by studs riveted to one of the links. No. 425,151. Harry Brammer.

Process for manufacture of extremely pure highly potent vitamin B compounds from rice polish, yeast, oat hulls, etc., by extraction, and zeolite treatment. No. 425,152. Laopold Raymond Cerecedo.

Apparatus for tip casting hollow metal articles. No. 425,157. John Pinkney Gowland Woking.

Design for union for flexible pipes. No. 425,158. William Horace Grint.

Electric arc furnace design. No. 425,163. Raoul Nissim.

Stable adhesive, suitable for labelling bottles composed of acid precipitated casein, an organic amide, zinc salt, ammonia, water, in stated proportions. No. 425,177. The Borden Company (John F. Corwin, Robert C. White)

Electric discharge lamp design. No. 425,179. Canadian General Electric Co. Ltd. (John Walter Ryde, Victor James Francis)

Stabilized mineral oil, employable as dielectric and insulating material, consisting of mineral oil and one tenth to three per cent wood resin therein. No. 425,181. Canadian General Electric Co. Ltd. (Frank M. Clark)

Triazine compound and method of preparation of alpha, beta-bis-(diamino s-triazinyl hydrazinocarbonyl) ethane. No. 425,183. Canadian General Electric Co. Ltd. (G. F. D'Alelio, James W. Underwood)

Recovery of magnesia and magnesia-silica mixture from siliceous dolomite by calcining the rock, slaking calcines in sugar solution, classifying slaked product to separate coarse and fine particles from the solution. No. 425,184. Canadian Refractories Ltd. assignee of The Honorary Advisory Council for Scientific and Industrial Research (F. E. Lathe, A. T. Prince)

Process for making hydrates of glyoxal by catalytic oxidation of ethylene glycol, employing silver catalyst, and inhibiting amount of formaldehyde formed by use of halogens or halogenated hydrocarbons. No. 425,185. Carbide and Carbon Chemicals Ltd. (Raymond W. McNamee, Jesse T. Dunn)

Copper oxidation of glycol to produce lower—1,2, dicarbonylic compounds—having from 2 to 3 carbon atoms, and their hydrates and polymers. No. 425,186. Carbide and Carbon Chemicals Ltd. (Raymond W. McNamee, Jesse T. Dunn)

Manufacture of pyruvic aldehyde by oxidation of propylene glycol under stated conditions and employing copper catalyst. No. 425,187. Carbide and Carbon Chemicals Ltd. (Raymond W. McNamee, Jesse T. Dunn)

Rubber hydrochloride compound stabilized with an open chain polyalkylene polyamine composed solely of alkylene and amine groups in which the terminal groups are primary amine groups. No. 425,192. Dominion Rubber Co. Ltd. (George Egbert Hulse, Jr.)

Nickel electrodeposition bath comprising an aqueous acid solution of a nickel electrolyte containing as a nickel brightening agent a pyrimidine compound of the class consisting of the sulphuric acid conversion products of 2-mercapto-6-methyl-4,6-diethyl dihydropyrimidines. No. 425,193. Dominion Rubber Co. Ltd. (Wm. Pieter ter Horst)

Lightweight, strong, tough, resilient insulating bat of mineral wool fibers bonded with urea-formaldehyde, and rendered flexible by inclusion of hydrocarbon lubricant. No. 425,194. Fiberglas Canada Ltd. (assignee of Owens-Corning Fiberglas Corporation (Wm. M. Bergin, Allen L. Simison)

Process for the manufacture of derivatives of cyclopentano-phenanthrene, comprising condensing derivatives of cycopentano-phenanthrene, containing a keto group adjacent to a methylene group, with an ester of formic acid in presence of suitable condensing agent. No. 425,203. Hoffman-La Roche Ltd. assignee of F. Hoffman-La Roche & Co. Ltd. (Robert Ernest Meyer)

Apparatus for settling solids from fluid suspensions. No. 425,212. Mining Process and Patent Co. (Leland Hamilton)

Irradiation of milk without impairing flavor by controlled use of multi-electrode arc lamp emanations. No. 425,214. National Carbon Company Inc. (Merrill J. Dorcas)

Sonic apparatus for controlling machinery used for surfacing sheet glass, such apparatus being sensitive to frequencies emitted by glass cracking. No. 425,217. Pilkington Brothers Ltd. (Frederic Barnes Waldron)

Engine oil filtration system design. No. 425,221. Tecalemit Ltd. (Camille Clare Sprankling Le Clair)

Continuous process for catalytic oxidation of dibenzyl to form benzoic acid and benzaldehyde. No. 425,240. Robert H. Van Schaack, Sr. (Robt. H. Van Schaack, Jr.)

Process for the manufacture of glycols, by hydrolysis of glycol chlorohydrin, in the substantial absence of substances which bind hydrochloric acid. No. 425,241. Henry Dreyfus.

(*To be continued*)

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

411,635. Continental Carbon Co., N. Y.; filed Aug. 2, 1943; Serial No. 462,446; for carbon black; since April 1939.

411,903. The Bengal Co., N. Y.; filed Feb. 17, 1943; Serial No. 458,584; for insecticides; since May 1, 1936.

411,926. The J. E. Harris Co., as The Wooster Sealkote Co., Wooster, Ohio; filed July 13, 1944; Serial No. 472,206; for paints; since May 15, 1924.

412,054. Lester Aronberg, as Markal Co., Chicago, Ill.; filed June 4, 1942; Serial No. 453,452; for paint in stick form; since May 9, 1942.

455,876. Synochem Corp., N. Y.; filed Sept. 30, 1942; for pharmaceuticals; since July 15, 1942.

466,188. Wisconsin Chemical Products Co., Milwaukee, Wis.; filed Dec. 29, 1943; for chemicals; since March 1938.

466,909. Gallowhur & Co. Inc., N. Y.; now Puratized, Inc.; filed Jan. 27, 1944; for fungicide; since Dec. 27, 1943.

467,108. Plastex Adhesive Products Inc., Brooklyn, N. Y.; filed Feb. 2, 1944; for plastic adhesives; since May 1, 1943.

467,865. G. F. Sterne and Sons, Ltd., Brantford, Ontario, Canada; filed Feb. 29, 1944; for protective coating preparations; since July 15, 1927.

469,417. Albert D. Spencer, as the Tragacanth Importing Co., N. Y.; filed Apr. 17, 1944; for industrial gums; since Jan. 1, 1929.

469,440. Perma Plastic Seal Co., Grosse Pointe Park, Mich.; filed Apr. 18, 1944; for plastic paints; since Mar. 23, 1944.

469,442. Plastex Adhesive Products Inc., Brooklyn, N. Y.; filed Apr. 18, 1944; for adhesives for coating textiles; since Nov. 15, 1943.

469,785 and 469,787. Carl Schleicher & Schuell Co. Inc., N. Y.; filed Apr. 28, 1944; for filter papers; since June 1, 1874.

471,221. Lederle Labs. Inc., N. Y.; filed June 14, 1944; for sulfanilamide; since May 5, 1943.

471,751. The Neville Co., Neville Island, Pittsburgh, Pa.; filed June 28, 1944; for coumarone-indene resin emulsions; since Apr. 13, 1943.

471,822. Standard Oil Co. of N. J.; Wilmington, Del.; filed June 29, 1944; for oils; since Sept. 27, 1943.

472,682. Selas Corp. of America, Philadelphia, Pa.; filed July 27, 1944; for fluid filters; since June 1944.

473,018. Creative Printmakers Group, N. Y.; filed Aug. 7, 1944; for printing ink; since June 15, 1944.

473,097. George Gallowhur, N. Y.; filed Aug. 9, 1944; for fire retardant coating; since June 23, 1944.

473,488. Stauffer Chemical Co., San Francisco, Calif.; filed Aug. 21, 1944; for insecticides; since January 1941.

473,754. The Scholl Mfg. Co. Inc., Chicago, Ill.; filed Aug. 30, 1944; for plastic sheets; since Aug. 10, 1942.

474,190. H. Behlen & Bro. Inc., N. Y.; filed Sept. 14, 1944; for paints; since July 1, 1944.

474,215. Stiefel Medicinal Soap Co. Inc., Preston Hollow, N. Y.; filed Sept. 14, 1944; for medicinal soaps; since 1847.

474,286. Kentucky Color & Chemical Co., Louisville, Ky.; filed Sept. 16, 1944; for insecticides; since Mar. 15, 1944.

474,657. Thomas A. Edison, Inc., West Orange, N. J.; filed Sept. 27, 1944; for gas-absorbing material; since Apr. 23, 1941.

474,707. Pennsylvania Glass Sand Corp., Lewistown, Pa.; filed Sept. 28, 1944; for silica; since July 6, 1927.

474,749. California Spray-Chemical Corp., Wilmington, Del., & Richmond, Calif.; filed Sept. 30, 1944; for insecticides; since July 25, 1944.

474,815. Phelan-Faust Paint Mfg. Co., St. Louis, Mo.; filed Oct. 2, 1944; for trim paints; since Mar. 1, 1939.

475,036. Albi Firepel Corp., N. Y.; filed Oct. 7, 1944; for fire retardant; since July 1942.

475,050. Gilmore Oil Co., Los Angeles, Calif.; filed Oct. 7, 1944; for protecting insulation; since Sept. 23, 1944.

475,087. Vita-Var Corp., Newark, N. J.; filed Oct. 7, 1944; for cleaning; since Aug. 10, 1944.

475,100. Central Soya Co. Inc., Fort Wayne, Ind.; filed Oct. 9, 1944; for soya bean insecticides; since Feb. 15, 1944.

475,377. The Sherwin-Williams Co., Cleveland, Ohio; filed Oct. 16, 1944; for paints; since Oct. 2, 1944.

475,559. The Diversey Corp., Chicago, Ill.; filed Oct. 21, 1944; for wood sealing compound; since July 19, 1944.

475,812. Roux Labs. Inc., N. Y.; filed Oct. 28, 1944; for dyestuffs; since July 3, 1941.

475,979. R-B-H Dispersions, Inc., Bound Brook, N. J.; filed Nov. 1, 1944; for inert pigments; since Aug. 23, 1944.

476,039. N. A. Woodworth Co., Ferndale, Mich.; filed Nov. 2, 1944; for ferrous alloy; since Oct. 11, 1944.

476,053. The Enthone Co., New Haven, Conn.; filed Nov. 3, 1944; for electroplating on aluminum; since Aug. 29, 1944.

476,054. The Enthone Co., New Haven, Conn.; filed Nov. 3, 1944; for oxidizer for aluminum; since Sept. 6, 1944.

476,085. Swain Nelson Labs. Inc., Glenview, Ill.; filed Nov. 3, 1944; for processing photographs; since Apr. 18, 1944.

476,110. Monsanto Chemical Co., St. Louis, Mo.; filed Nov. 4, 1944; for treatment of vegetable fiber pulp; since June 3, 1944.

476,133. Lawrence R. Bradley, as The Periseal Co., N. Y.; filed Nov. 6, 1944; for enamel undercoater; since July 1, 1941.

476,474. The Mercirex Co., Milford, Del.; filed Nov. 15, 1944; for medicated soap; since Aug. 3, 1923.

476,543. Ajax Electrothermic Corp., Trenton, N. J.; filed Nov. 17, 1944; for electric furnaces for lab.; since Apr. 28, 1920.

476,615. Eugene P. Jordan, as Soft Water Equipment Co., Los Angeles, Calif.; filed Nov. 18, 1944; for water softeners; since March 1941.

476,854. Vita-Var Corp., Newark, N. J.; filed Nov. 24, 1944; for adhesive; since Aug. 10, 1944.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, Jan. 23 to Feb. 13, 1945.

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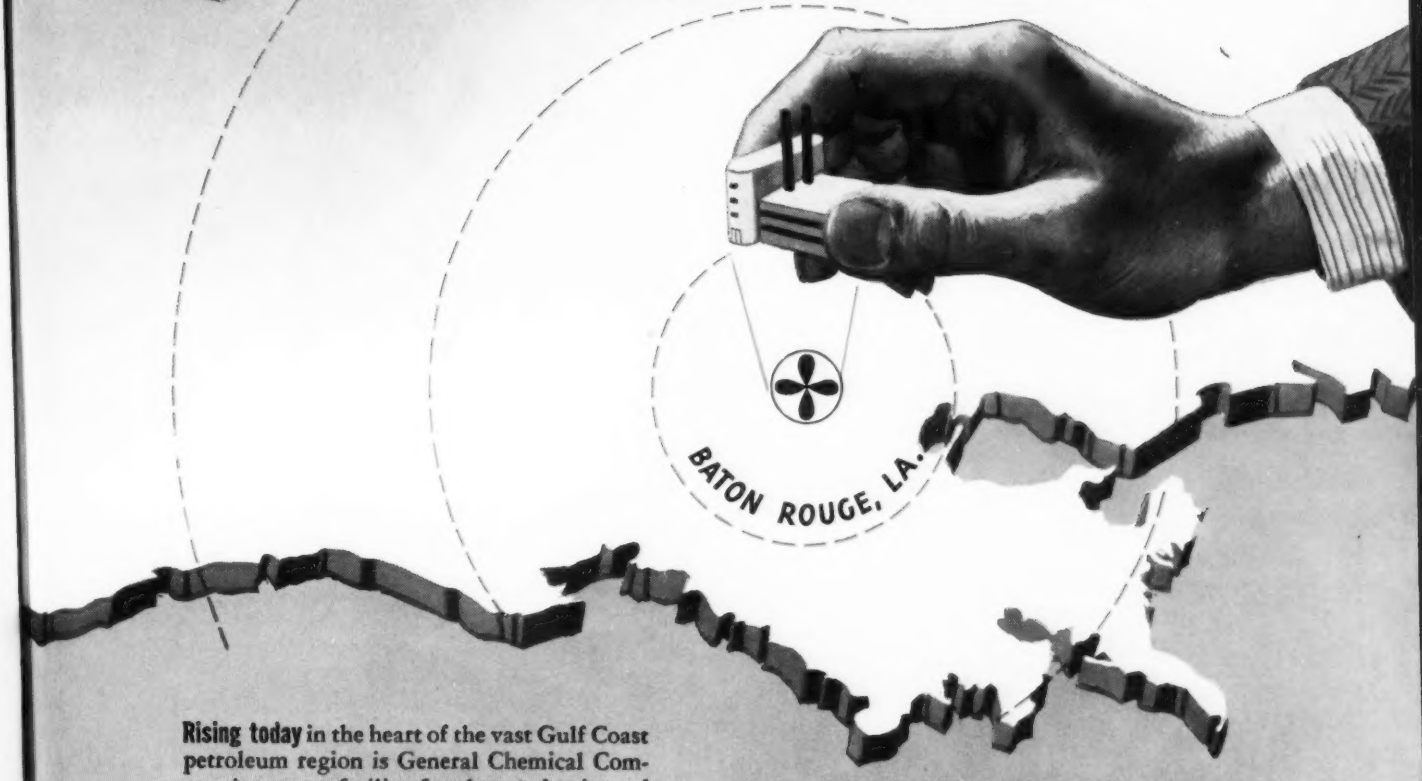

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